Rheem Australia Pty Ltd

ABN 21 098 823 511

SERVICE INSTRUCTIONS

Solar Loline with Gas Boost

TM006

Revision: C

Published: March 06

531260

Contents

Safety Warning

The purpose of this service manual is to provide sufficient information to allow a person with the skills as required by the Regulatory Authorities to carry out effective repairs to a Rheem Solar Loline Water Heater in the minimum of time.

Safety precautions or areas where extra care should be observed when conducting tests outlined in this service manual are indicated by print in ***bold italics*** and/or a warning symbol**.** Take care to observe the recommended procedure.

Working on roofs should always be considered a hazardous activity; by law you must observe certain minimum safety precautions. These safety precautions are outlined in the WorkCover Code of practice "Safe work on roofs" Part 1and 2 and in the Occupation Health and Safety Act 1983.

Certain diagnostic procedures outlined in these service instructions require "live" testing to be conducted. Caution should always be exercised when conducting these tests to prevent the risk of electric shock. (Refer to Rheem Safety Procedure on electrical testing)

Introduction

The information provided in these instructions is based on the water heater being installed in accordance with the Installation Instructions provided with each water heater.

Should you require further technical advice on a Rheem Solar Loline with Gas Boost Water Heater, contact your nearest Rheem Service Department where all genuine replacement parts are also available.

Water Heater Model Identification

The identification numbers are designed to convey detailed information about the water heater to which it is attached. The model number consists of 7 digits and 1 letter.

5	3	1	260	N	0

Type
5 - Solar

Cylinder Warranty
3 - 5 Years

Installation
0 – Indoor
1 - Outdoor

Storage Capacity
260 - 260 litres

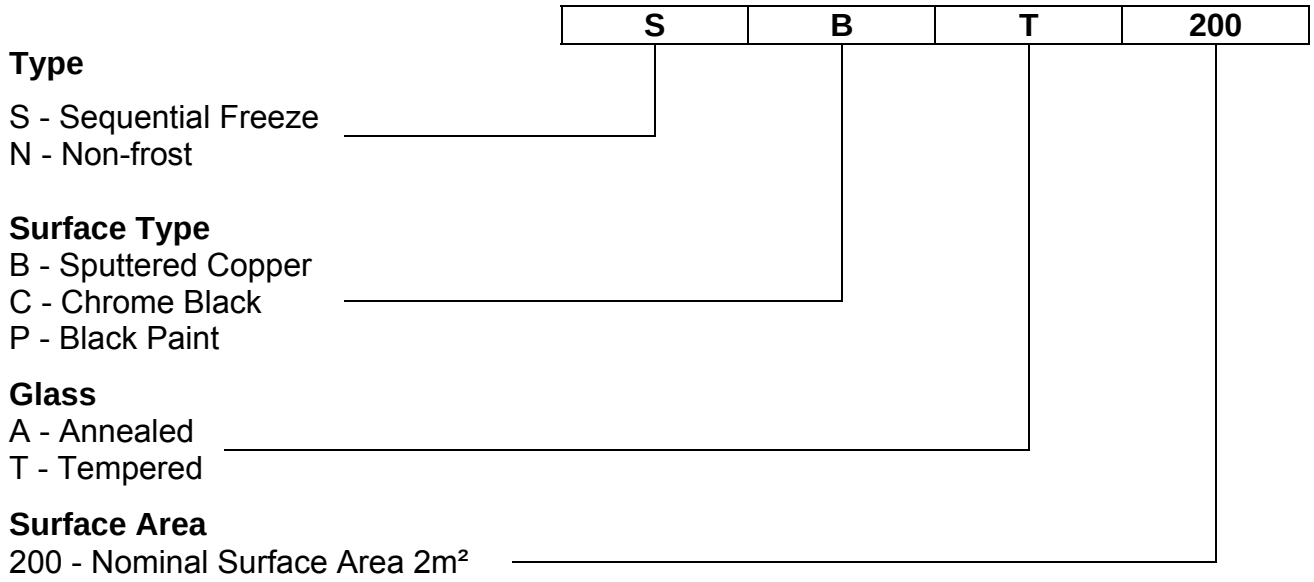
Gas Type
N – Natural Gas
P – Propane Gas
B – Butane Gas

0 - No Reference

The model number, serial number and date of manufacture should be quoted in all correspondence.

Collector Model Identification

The identification numbers are designed to convey detailed information about the collector to which it is attached. The model number consists of 3 digits and 3 letters.



Specifications

		Model		
		531260N0	531260P0	531260B0
Max Water Supply Pressure (kPa)	With ECV	680	680	680
	Without ECV	800	800	800
Minimum Gas Supply Pressure (kPa)		1.13	2.75	2.75
Maximum Gas Supply Pressure (kPa)		3.5	3.5	3.5
Maximum Thermostat Setting (ºC)		66	66	66
ECO Cut Out Temperature (ºC)		82+/- 3	82+/-3	82+/-3
Storage Capacity (Litres)		260	260	260
Booster Capacity (litres)		208	208	208
Hourly Recovery Rate (Litres @45ºC rise)		113	113	113
Anodes	Quantity	2	2	2
	Length (mm)	1100	1100	1100
Baffle	Blades	18	18	18
	Length (mm)	1260	1260	1260
Water Connections - Tank	Inlet	RP¾/20	RP¾/20	RP¾/20
	Outlet	RP¾/20	RP¾/20	RP¾/20
Water Connections - Collector	Hot pipe	½" BSP	½" BSP	½" BSP
	Cold Pipe	½" BSP	½" BSP	½" BSP
Gas Connection		RP ½/15	RP ½/15	RP ½/15
T&PR Valve	Diameter	RP ½/15	RP ½/15	RP ½/15
	Rating kPa	1000	1000	1000
Pilot Injector (mm)		0.27	0.16	0.16
Burner Injector (mm)		2.25	1.35	1.30
Burner Test Point Pressure (kPa)		1.00	2.75	2.70
Thermal Input (MJ)		26	25	25

Preventative Maintenance – To Be Done By Qualified Persons

It is suggested for peak performance that the water heater be serviced annually.

1. Check for discharge from the T&PR valve. Whilst the booster is off, and during periods of low solar contribution there should be no discharge of water. When the booster is operating or during periods of high solar contribution, a small discharge of water may be evident. Operate the valve-easing lever to ensure the valve opens and resets properly. Always open and close the valve gently. The T& PR valve should be replaced at 5 yearly intervals.
2. Check for leaks at the collector connectors, the hot and cold pipe and all tank fittings.
3. Check the collector glass is not cracked and the absorber plate finish is not deteriorating.
4. Confirm all supports and anchors retaining the collector/s to the roof are present, firmly fixed and in good condition.
5. Clean the collector glass. Do not stand on the collectors while cleaning.
6. Check for signs of plant or tree growth that may be shading the collectors. Advise customer to have pruned if possible.
7. Check for signs of excessive corrosion on the water heater jacket, collector panels and roof stand if fitted.
8. Check the pilot light is burning with a small blue flame. Remove and clean the pilot burner if there is a tendency for yellowing of the flame, water heaters operating on LP gas may exhibit a slightly yellow flame, this is normal.
9. Check the main burner flame to ensure all ports ignite readily and that the flame is blue with little or no yellowing of the flame tips. Remove and clean the burner head if necessary.
10. Check the operation of the Piezo igniter. The pilot should light after 2 or 3 operations of the Piezo, if not, check for correct spark gap, burnt electrode or cracked ceramic insulator.
11. Check the operation of the flame failure magnetic valve. The magnetic valve should be held open within one minute by the thermocouple.
12. Warn the customer of the danger of using flammable materials or aerosol spray packs near the water heater. Aerosols and harsh chemicals can cause premature failure of the water heater components.

Product Changes

Timer

Timers manufactured from 2002 on have a change to the display when setting the program. When setting a program to run for seven days the timer now displays all seven days (mo tu we th fr sa su) across the display. Timers manufactured prior to 2002 did not display any days when the program is set for seven day operation.

Heater

In March 2005 the inlet dip tube was changed and is now the same as the hot water outlet dip tube.

Differential Controller

In February 2006 the differential controller software was upgraded to version RSC_V2_0. A number of changes have been made to the operation of the controller

1. Frost circulation start temperature increased from 3°C to 4°C
2. Frost circulation end temperature increased from 5°C to 6°C
3. Frost protection minimum pumping time increased from 240 seconds to 400 seconds
4. Minimum pump run time and pump off time of 400 seconds added in 'normal mode'
5. Failure of hot sensor causes pump to run for 400 seconds every 30 minutes until cold sensor detects 70°C or hot sensor fault rectified
6. Failure of cold sensor does not interrupt the operation of 'defrost mode'
7. Additional 'heat dump' mode added.

Heat Dump Mode

If the temperature detected by the cold sensor is over 70°C the circulator will run if the temperature detected by the hot sensor is over 130°C. Operation ceases when either the detected temperature of the hot sensor drops below 110°C or the temperature detected by the cold sensor rises above 80°C.

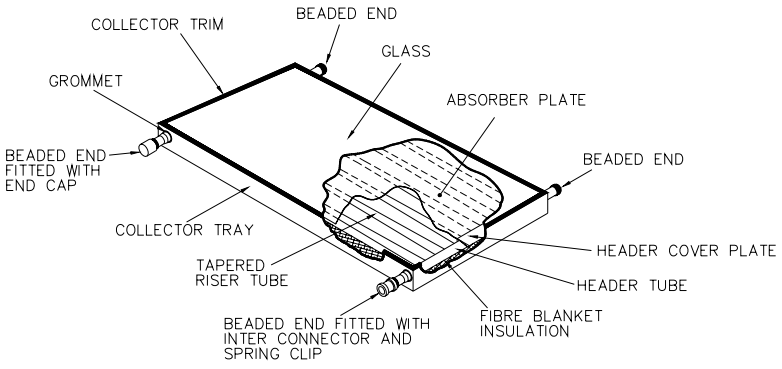
Collectors

The SCT series collectors have been replaced by the SBT collector. The SBT collector is longer and narrower than the SCT collector. Due to the dimension changes it is not possible to couple an SBT collector to an SCT collector. In the event of an SCT collector failure the entire collector array will require replacement.

Sequential Freeze Principle

The sequential freeze collector features tapered risers that reduce in diameter along their length from 12.7mm at the header pipes to 9.5mm at the centre. During periods of low ambient air temperatures the water in the collectors will freeze at the narrowest point of the tapered riser first, due to the small volume of water present, and then continue to freeze in a controlled fashion along the length of the riser.

This is known as sequential freeze. The water that is displaced during the freezing process is able to expand back to the tank via the header pipes and the hot and cold pipe, ensuring pressure does not build up in the collector, resulting in split pipe work. The headers are 32mm in diameter to ensure water will not freeze and prevent the expanding water from returning to the tank.



During periods of frost if the hot water sensor mounted in the collector hot pipe senses a temperature of 4ºC the differential controller will turn the circulator on to allow water to pass through the collector array. This flow of water will prevent the DN15 pipe work to and from the collector from freezing. Recirculation ceases when the hot sensor detects a temperature of 6ºC and the circulator has run for at least 400 seconds.

Operation

Solar

The Solar Loline with Gas Boost operates on the temperature differential principle. As water in the collectors gain heat from solar radiation, a sensor mounted at the hot outlet of the collector senses the temperature increase.

When the temperature is 8ºC above the temperature being sensed by the cold water sensor (mounted in the cold water supply to the collectors) the differential controller turns a circulator pump on. The circulator moves the colder water in the tank up to the collectors via the cold pipe and the heated water down to the tank via the hot pipe.

When the temperature difference between the hot and cold sensors falls to within 4ºC the differential controller turns the circulator pump off.

The differential controller will not allow the circulator pump to turn on if the temperature sensed by the cold sensor is 70ºC or higher unless the controller enters 'heat dump' mode. Recirculation will recommence once the temperature at the cold sensor falls below 50ºC.

Heat Dump Mode

If the temperature detected by the cold sensor is over 70°C the circulator may run if the temperature detected by the hot sensor is over 130°C. Operation ceases when either the detected temperature of the hot sensor drops below 110°C or the temperature detected by the cold sensor rises above 80°C.

Gas

When the gas control knob is depressed in the pilot position, it allows gas to flow to the pilot head where it can be ignited by a spark from the piezo igniter.

The pilot flame heats the thermocouple creating an electrical current to energise the magnetic safety valve and hold it in the open position, allowing the pilot to remain alight when the gas control knob is released. **The pilot must be lit for the gas booster to operate.**

The gas control knob can then be rotated anticlockwise, by depressing slightly, to supply gas to the main burner. The main burner is lit via a cross light action between the pilot and the gas emanating from the main burner.

Position 7 on the gas control knob will heat the water to approximately 66ºC. Each number on the gas control represents a water temperature change of approximately 6ºC.

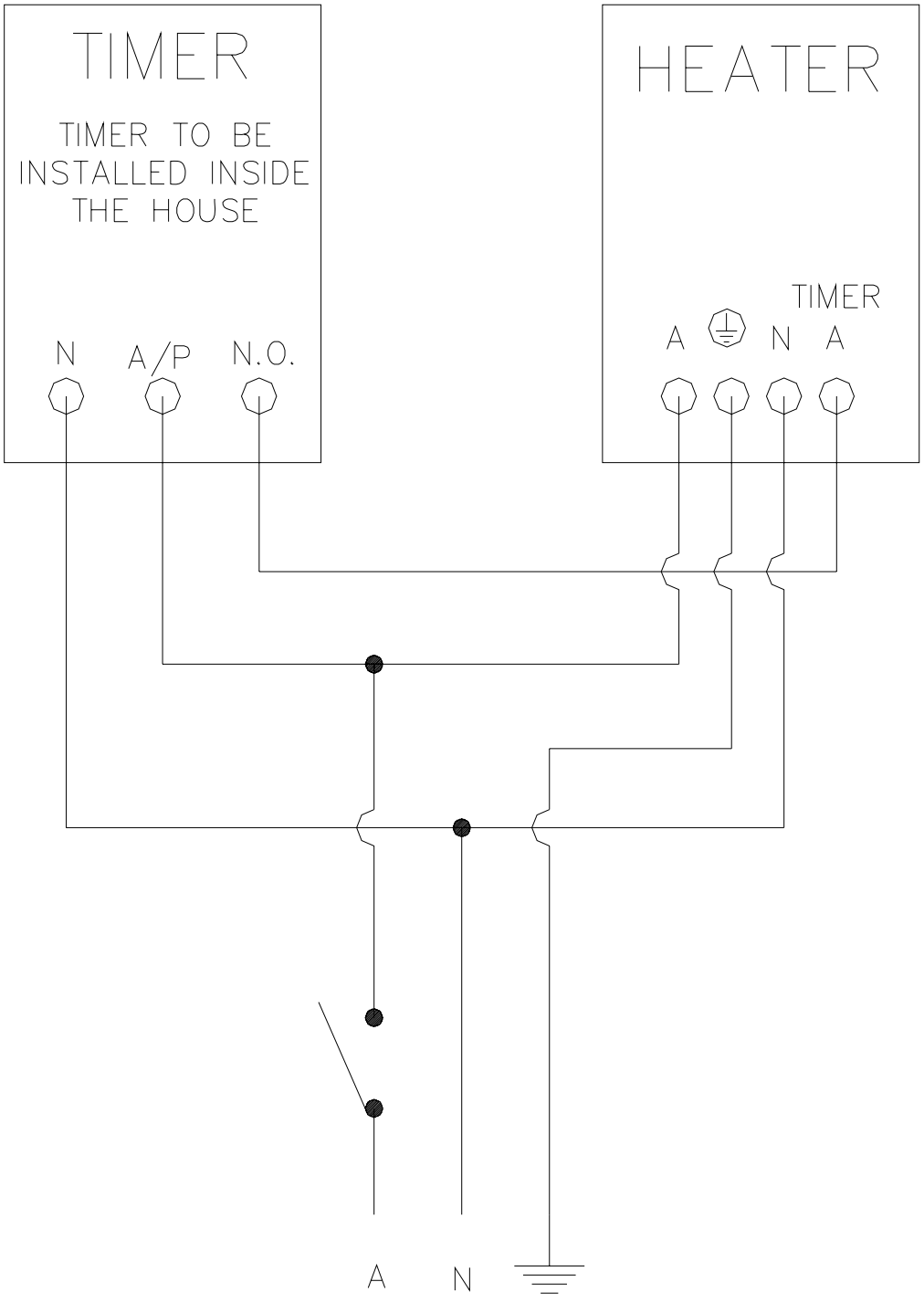
The water temperature is maintained by means of a liquid contained in the sensing bulb expanding in the capillary tube and operating a bellows located in the gas control body.

As the water temperature increases the bellows expands and acts on the valve seat by means of a lever. When the required set temperature is reached the main gas way is closed and the main burner is extinguished.

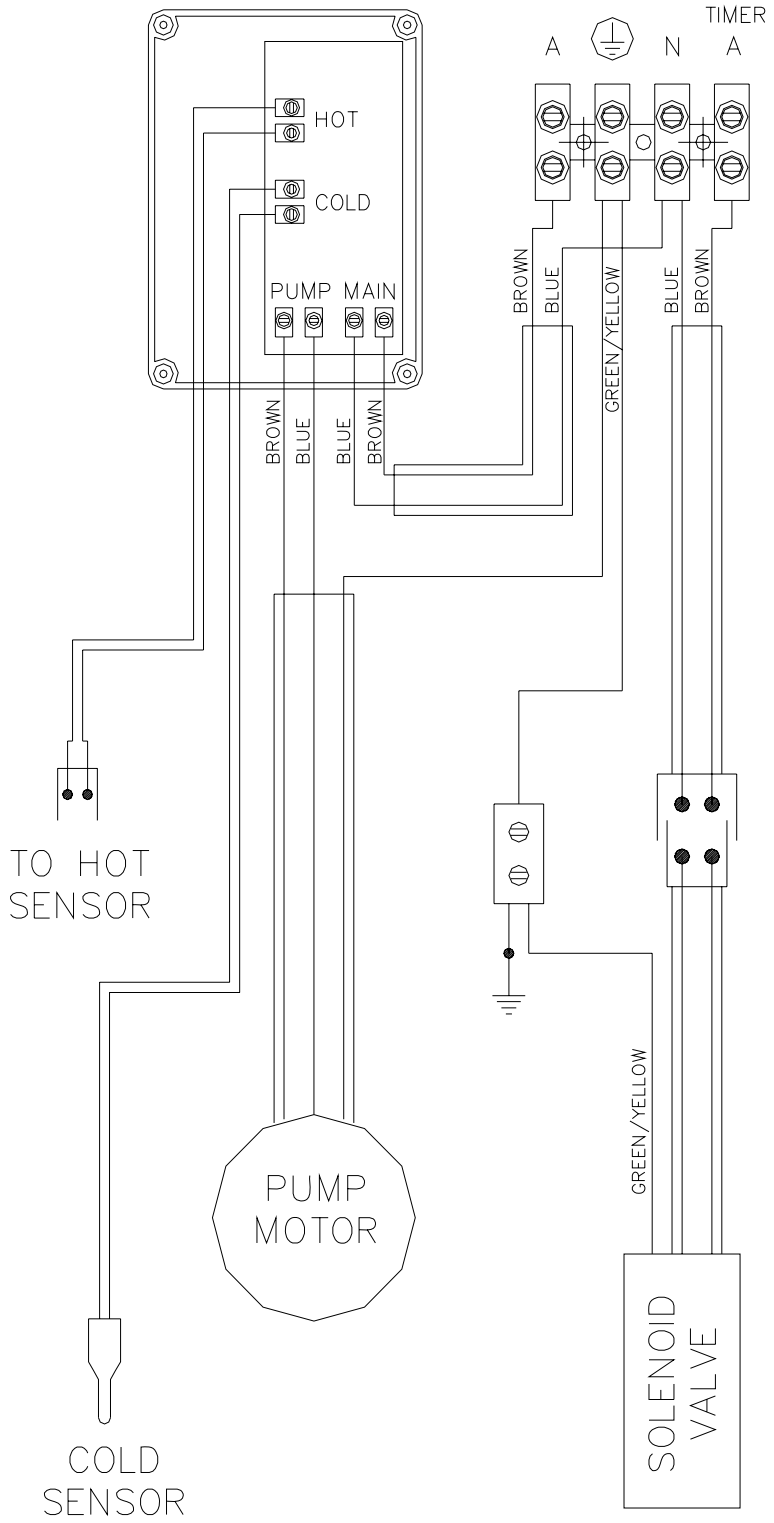
A timer supplied with the water heater, for installation in the premises, controls a solenoid mounted in the main burner gas feed pipe. The solenoid prevents the burner from operating unless power is received from the timer.

The purpose of the timer is to allow control of the burner operation in addition to the gas control. The timer can be set to provide a boost period each day or a "one shot" boost can be operated if required.

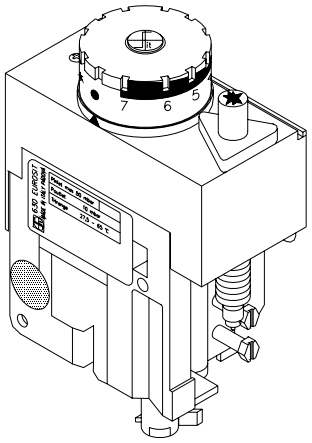
Electrical Connections



Circuit Diagram



Lighting Instructions



1. ***Ensure the gas control knob is in the "●" position (the off position).***
2. ***Wait five (5) minutes so any build up of gas can escape.***
3. Turn the gas control knob to the "✱" position (the pilot position).
4. Depress the knob fully (until the ✱"" disappears below the housing) and after thirty (30) seconds, whilst keeping the gas control knob depressed, press the igniter button several times to ignite the pilot flame.

⚠ ***Keep face clear of the combustion chamber opening while pressing the igniter.***

Note: It is not possible to depress the knob fully if the gas control has activated its safety shut off feature. In this case wait 60 seconds for the gas control to reset.

5. Keep the knob depressed for twenty (20) seconds after the pilot flame lights.
6. Release the gas control knob and check if the pilot is still alight. The pilot can be checked by looking through the large opening below the gas control.
7. If the pilot has failed to light or has not remained alight, turn the gas control knob to the "●" position (off position). ***Wait five (5) minutes for the escape of unburnt gas,*** and then begin again at step 3.
8. When the pilot flame remains alight with the gas control knob released, slightly depress the gas control knob and turn it anticlockwise to one of the numbered settings. A setting of "6" is recommended; this will give a water temperature of approximately 60ºC.
9. Turn the gas control knob to a higher number for higher water temperatures or to a lower number for lower water temperatures.
10. Replace the access cover.
11. If the main burner does not light at the selected setting, the water may already be at the selected temperature.

⚠ ***NEVER press the igniter button when the gas control knob is not in the "✱" position (pilot position).***

Hot Water Physics Related to Solar Water Heaters

There are physical properties of hot water that are common to all types of heating mediums. However, with solar heating an understanding of these properties will be of assistance to servicing a solar water heater.

Stratification - The term used to describe thermal stratification within a water heater where hot water will lie above cooler water without mixing. Stratification allows the storage water heater to deliver hot water from the outlet, while refilling with cold water at the inlet.

Stagnation temperature - This is the temperature at which HEAT LOSS is equal to HEAT INPUT. In this case when water stops circulating through the solar collector the temperature will rise to the STAGNATION TEMPERATURE.

Flash Steam - This is when water under pressure is heated to temperatures above 100ºC, and then the pressure is suddenly reduced (by opening a hot tap) allowing the excess heat to be converted to steam. This steam requires 1689 times more space than water and fights inside the system to get out, resulting in a rumbling noise commonly referred to as "elephants on the roof" by customers. The steam is dissipated when it reaches the large volume of water in the storage tank and condenses.

Density of water - Water is at its maximum density at 4ºC. When heated above that point up to 100ºC it expands, unequally, an average of 1/23 of its volume. However between 10ºC and 65ºC the expansion is approximately 1/50 of its volume. This is known as THERMAL EXPANSION, or expansion, and is relieved through the temperature and pressure relief valve (T&PR valve).

Note: Water will expand relative to its rise in temperature. The discharge from the T&PR valve is usually the result of thermal expansion due to heating, the quantity of the discharge will be affected by:

- The amount of water being heated
- The temperature rise from cold to hot
- The pressure rating of the T&PR valve
- The number of times a hot tap is opened during a heating cycle
- The amount of water lost through dripping taps
- Faulty Non-return valve fitted to cold water inlet

It should be noted that a T&PR valve would not discharge water due to thermal expansion when the heating cycle is not on.

Boiling point of water - The temperature at which water boils is directly related to the pressure to which the water is subject to.

- Water will boil at below 100ºC if the pressure is below 101kPa (atmospheric pressure at sea level).
- At sea level the boiling point of water is 100ºC
- Water will boil at above 100ºC if the pressure is above 101kPa (water at 1000kPa will boil at approximately 183ºC).

Specific heat - The amount of energy required to raise 1kg of a substance by 1ºC. Measured in units of kilo-joules (kJ) i.e. 4.2kJ will raise 1 litre of water 1ºC.

Latent heat (Hidden or invisible heat) - The energy required to change the state of a substance (water) into another state without a change in temperature i.e.

- water to steam and steam to water
- water to ice and ice to water

The latent heat of steam is approximately 6 times the specific heat of water, i.e. to convert water at 100ºC to steam at 100ºC will require approximately 252 kJ/kg.

Freezing of water

Water cooled below 4ºC expands insignificantly until it reaches the point of its changing state into ice, at which time it expands by 1/11th of its volume. Ice contracts on further cooling. Damage to solar collectors occurs when:

1. Water trapped between two plugs of ice is compressed by the ice expansion to a point where the pressure results in a failure of the copper tube.
2. An ice plug forms in a tee or elbow and the expansion cannot be relieved, resulting in a split fitting.

Components and their Function

Temperature and Pressure Relief Valve (T&PR): A valve designed to provide automatic relief by discharging water in case of excessive temperature, pressure or both.

Never fit a T&PR Valve with a pressure rating greater than that indicated on the product-rating label.

Outlet Delivery Tube (Dip Tube): A plastic tube installed in the hot water outlet of the water heater cylinder to conduct water from the highest point to the outlet connection. It also acts as a fitting liner.

Inlet Delivery Tube (Dip Tube): A plastic tube installed in the cold-water inlet of the water heater to ensure incoming hot water from the collectors is delivered into the cylinder while maintaining stratification.

Cold Pipe (Solar Return): The pipe connecting the solar collectors to the storage water heater through which, the cooler water returns from the storage tank to the collectors.

Hot Pipe (Solar Flow): The pipe connecting the solar collectors to the storage tank through which, the solar heated water flows back to the storage tank from the collectors.

Circulating Pump: A small centrifugal pump that circulates water through the collectors.

Differential Controller: An electronic control unit that interprets low voltage signals indicating water temperature from the hot and cold sensors to switch on and off the 240 volt circulating pump circuit. The unit is factory set and cannot be adjusted or mega-ohm tested.

Hot Sensor: A thermistor for sensing water temperature, fitted into the connector at the hot pipe connection on the collector. Supplied with 20 metres of cable for connection to the differential controller.

Cold Sensor: A thermistor for sensing water temperature, fitted into a 4-way tee at the cold-water pickup for the collectors on the water heater.

4- Way Tee: A special purpose brass fitting to which the connections to the water heater; solar cold pipe; drain cock and cold-water sensor are all connected.

Anode (Sacrificial): A metal alloy electrode installed in the water heater cylinder that by galvanic action protects the cylinder from corrosion.

Burner Feed Pipe Solenoid: An electro-mechanical device that prevents the flow of gas to the burner head until a signal is received from a timer. Allows the burner to be operated only during periods of low solar contribution or high hot water demand.

Eurosit 630 Gas Control: The gas control is a multi functional single knob gas control. It is gas type specific and designed for Natural Gas, LPG or Towns Gas. ***The control is factory set and not field serviceable or gas type convertible.***

The gas control is manufactured without the temperature sensor and over temperature switch (ECO) enclosed in a sheath.

The sheath is a separate item and is screwed into the cylinder during manufacture. A slot in the head of the sheath is aligned in the horizontal position to allow the snap-on bracket at the rear of the gas control to be located positively.

This design allows the gas control to be replaced without the need to drain the water heater.

Note: The only time the sheath needs to be removed is in the event of a leak developing at the cylinder connection or in the sheath itself. ***In this case the water supply needs to be isolated and pressure relieved from the cylinder.***

In the event of a sheath replacement, use a 27mm AF socket to prevent damage to the slot. apply thread sealing tape and tighten so that the slot is horizontal with a minimum of 2 threads or a maximum of 4 threads protruding from the cylinder fitting.

Over Temperature Energy Cut Out (E.C.O.): A temperature-sensing device in combination with the gas control that automatically cuts off the gas supply to prevent excessive water temperature occurring. This device will reset automatically once temperatures have fallen to a safe level allowing the pilot to be relit.

Thermocouple: A device that generates a small electric current when heated. Thermocouples are available in T.S (thermal switch) and non-T.S. types. The current generated by the thermocouple is used to hold a thermo-magnetic valve, fitted in the gas control, open.

The pilot assembly is designed to ensure that the T.S. (thermal switch) thermocouple manufactured by S.I.T. specifically for this product is the only type used as a replacement.

The use of a T.S. thermocouple is to provide a safety shutdown in the event of a blockage in the combustion chamber or flue way.

IMPORTANT: If replacing an open circuit T.S. thermocouple, it is essential to investigate the cause of failure. Possible causes include; incorrect installation of the water heater, i.e. Incorrect distance from corners of walls or the back of the water heater not against a wall; Exhaust fans or air conditioners close by.

Thermal Switch: A one-shot safety device mounted in the thermocouple near the gas control that senses excessive heat outside the combustion chamber. This device cannot be reset.

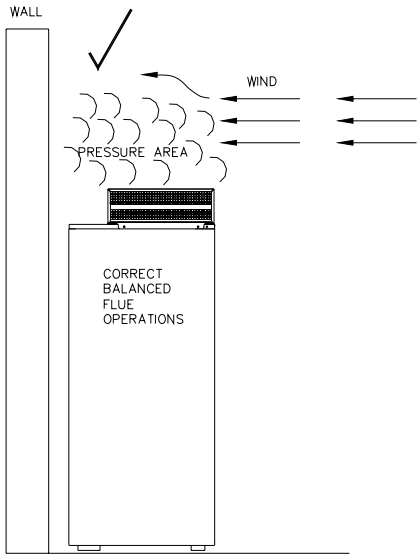
Magnetic Valve: A solenoid type gas isolating valve held in the open position by a small electric current generated by the thermocouple. This valve will completely isolate the supply of gas to the burner in the event of a pilot flame failure.

Flue Baffle: A baffle inserted into the water heater flue tube that slows the passage of flue gases to ensure maximum heat transfer to the stored water.

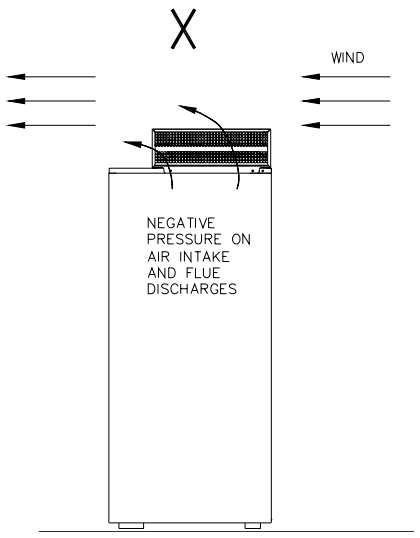
Balanced Flue Principal

In practice it is almost impossible to achieve exact balance between the pressure on the air inlet and flue outlet of a balanced flue terminal. In order to avoid the possibility of reverse fluing the flue terminal design is always biased to provide slightly higher pressure on the air inlet.

The flue terminal on outdoor water heaters has the air inlet towards the rear. When the water heater is installed against an external wall, the pressure zone created by any wind will produce the required pressure imbalance for the flue terminal to operate correctly.



If the water heater is not installed against a wall, the pressures at the air inlet and flue outlet become unpredictable, resulting in the combustion system not operating correctly. Specifically, there may be flame roll out from the combustion chamber, sooting of the primary flue and flue terminal and/or pilot outage problems.



Common Faults

When a complaint is lodged about the performance of a hot water system there are a number of causes that should be checked and eliminated.

In an attempt to pinpoint the most likely cause it is important to discuss with the customer their reasons for the complaint, the duration of the problem, any change in circumstances or usage and recent weather conditions.

This information in conjunction with the following listed common complaints will assist you in locating the most likely cause. All procedures assume there is water flowing through the water heater.

Excessive hot water usage: The complaints of insufficient hot water and no hot water can on many occasions be attributed to hot water usage exceeding the capacity of the water heater to provide hot water.

When first attending a call of this nature it is essential to establish the probable hot water usage by querying the usage habits of the household and compare this with the potential delivery of the model water heater installed.

It can then be established if the usage is within or outside the capacity of the model. The areas to look at for excessive usage are:

1. Automatic washing machines.
2. Showers exceeding 11 litres/minute for mixed water and 5 minutes in duration.
3. Two or more showers operating at the same time.
4. Change of occupancy or number of persons increased.
5. High water pressure area. (Excessive T&PR discharge)
6. Plumbing leaks

Discoloured water

1. This may be the result of discoloured water entering from the cold water mains. Check if the cold water is also discoloured.
2. Brown coloured water will generally indicate that the anode has been depleted or the water heater is near the end of its useful life.
3. Milky coloured water is generally air in suspension and will disperse of its own accord. In very hard water areas where anode gassing occurs, milky water may be evident. The use of a blue anode should overcome this problem.

Water hammer: A water heater will not cause water hammer, however valves associated with the water heater may be the source of the problem i.e. cold-water stopcock, non-return valve, T&PR valve or relief valve.

Most water hammer problems are associated with plumbing, hot and cold, or appliances i.e. solenoid valves, ballcocks, loose pipes, sharp angles in pipe work, faulty or worn valve parts or neighbouring equipment.

High water pressure areas will have more complaints of this nature and the use of a pressure-limiting valve (PLV) to reduce the household cold-water pressure will usually solve most problems.

Roof leaking: This complaint is usually made during or after wet weather and normally soon after commissioning a new solar water heater. The movement of persons on the roof during installation can crack roofing material if the load is borne on specific points or the roof material is brittle.

Replacement of damaged roof materials is essential. Use of a woven plastic roof sheet below the collectors will make water penetration more difficult in the future. It should also be established if water is penetrating around the pipe or sensor joints through the roof.

Moisture under the collector glass: Small amounts of condensate on the underside of the collector glass are not a sign of collector failure.

The condensation is formed from humid air condensing when the collector cools down. Because of high temperatures within the collector, ambient air is transferred in and out of the collector through drain holes. Note: The collector is not hermetically sealed.

Hot water plumbing leaks: If hot water has not been used for a period of time, feeling the temperature of the hot water line may give an indication of water flow if the pipe is warm.

The method of checking for plumbing leaks is:

1. Turn off the stopcock on the cold water supply to the water heater.
2. Open a hot tap to ensure the flow of water stops. This will confirm the stopcock is operating correctly.
3. Turn off the hot tap.
4. Turn on the stopcock to make up the water pressure in the cylinder, and then turn the stopcock off again.
5. Wait approximately 5 minutes then do either of the following:
    a. With your ear close to the stopcock turn it on slightly and listen for any water passing. If there are no leaks, water should not pass.
    b. Open a hot tap while listening for any pressure release. If there is a pressure release there will be no leaks in the plumbing system.

Mixing or crossed connections: If an automatic dishwasher, washing machine, flick mixer tap, tempering valve or thermostatic mixing valve is installed there is always the possibility that the cold water could mix with the hot water through a faulty or incorrectly installed valve.

This is referred to as a cross connection. The complaints of insufficient hot water, water too cold or excessive discharge from the T&PR valve may be attributed to a cross connection.

The method of checking for a cross connection is:

1. Turn off the stopcock on the cold water supply to the water heater.
2. Open a hot tap. If water flow is persistent and cold a cross connection exists.

Before Servicing a Solar Water Heater

Working on roofs should always be considered a hazardous activity, particularly early in the morning, late in the evening or after periods of rain. Safety precautions pertaining to working on roofs are outlined in the WorkCover Code of Practice "Safe work on roofs" Part 1 and 2 and in the Occupational Health and Safety Act 1983

Water under pressure and at temperatures up to 150ºC may be present in the collector/s. Isolate water supply and relieve pressure through a hot tap or the temperature and pressure relief valve prior to opening the collector pipe work. Protective clothing should be worn to prevent scalding or burns.

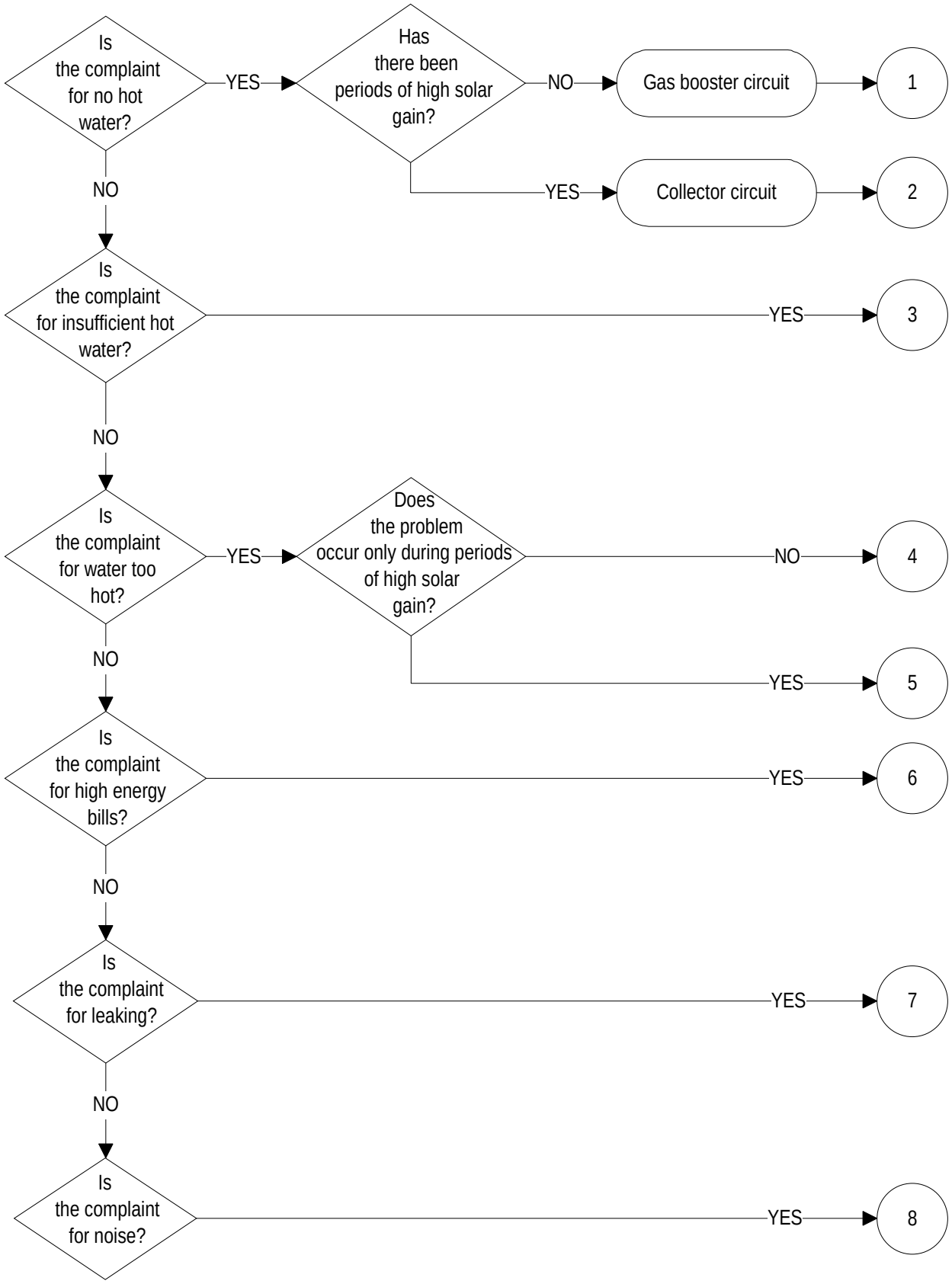
Certain diagnostic procedures outlined in these service instructions require "live" testing to be conducted. Caution should always be exercised when conducting these tests to prevent the risk of electric shock.

Fault Finding Charts

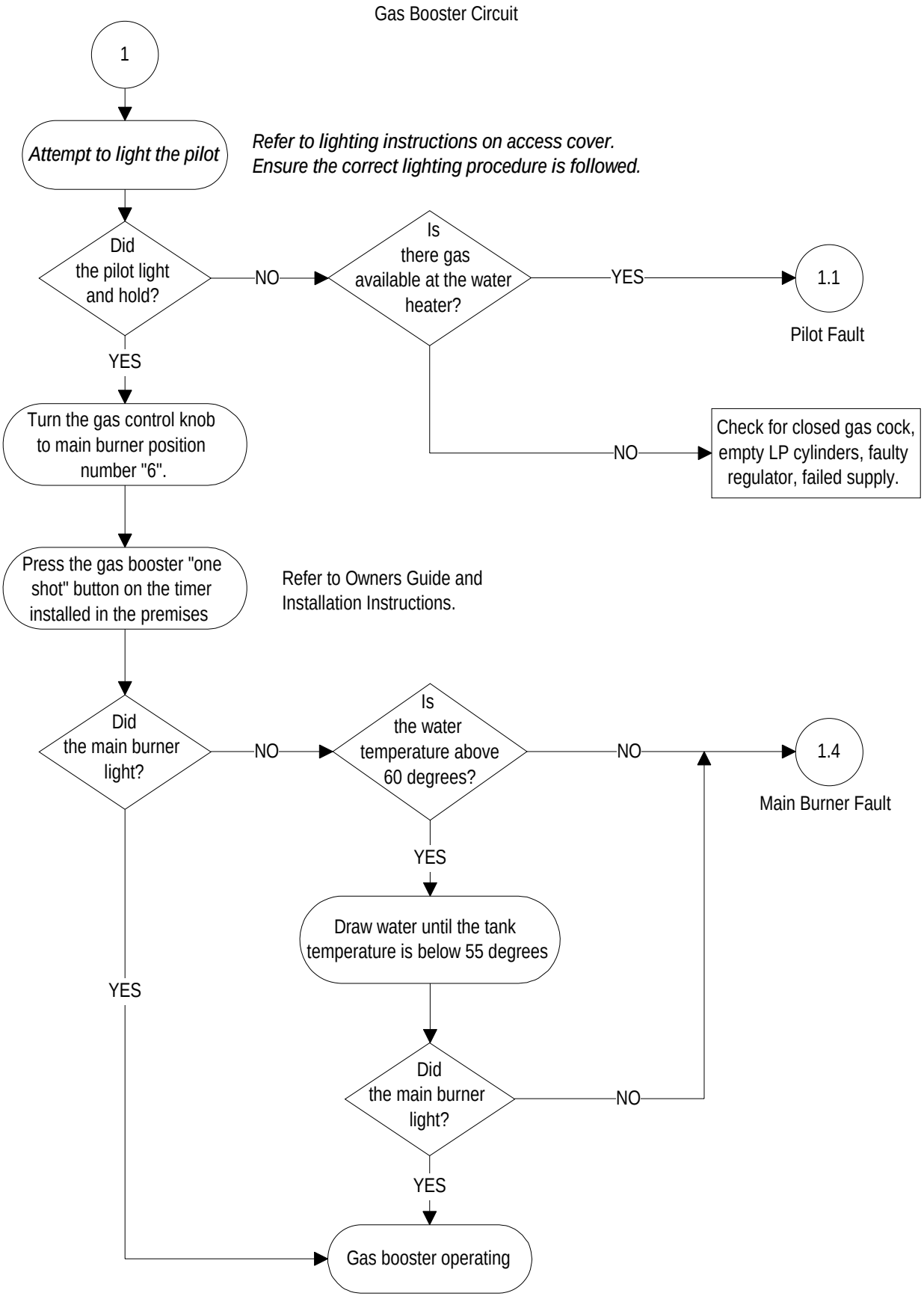
Fault		Chart number	Page
No hot water	Gas booster circuit	1, 1.1, 1.2, 1.3, 1.4, 1.5	19,20, 22,23,25,27
	Differential Controller	2	28
	Collector circuit	2.1, 2.2	32,33
Insufficient hot water		3	34
Excessive discharge from T&PR valve		3.1	34
Water too hot	Gas booster circuit	4	35
	Collector circuit	5	36
High energy bills		6	36
Leaking water heater		7	37
Noisy water heater		8	38

Fault Finding

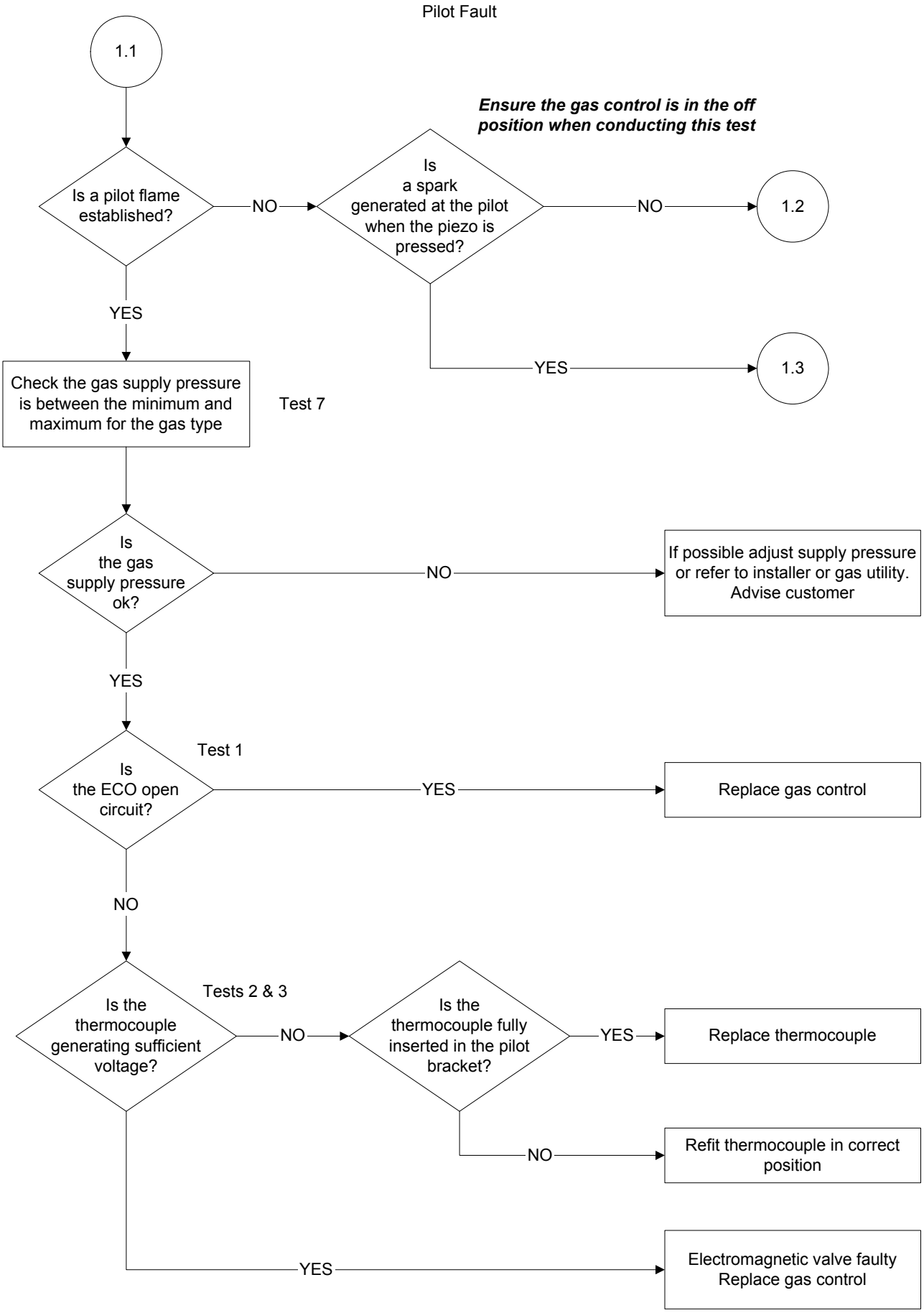
Fault Diagnosis Sequence



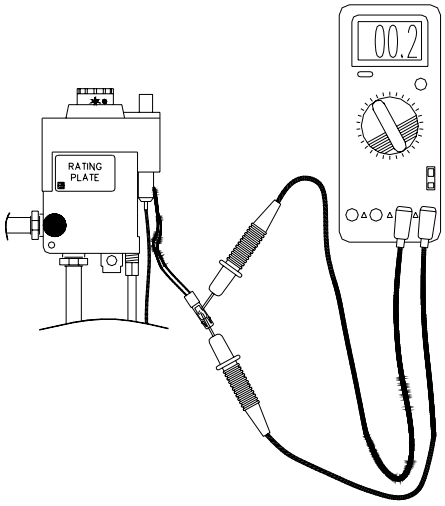
Fault Finding Chart 1



Fault Finding Chart 1.1



Component Tests 1 - 3

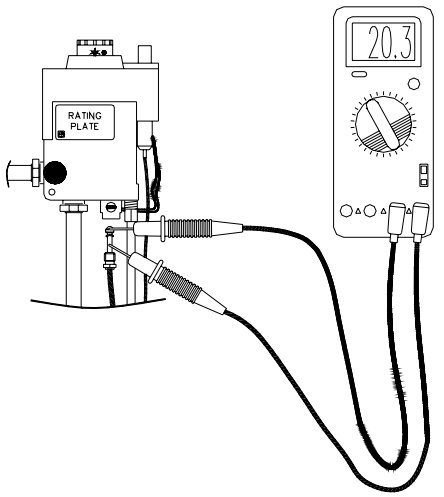


Test 1

Isolate power before conducting test

Using a multimeter set on the x1 resistance scale, measure across the terminals of the interrupter block on the gas control.

The reading should be less than 1 ohm



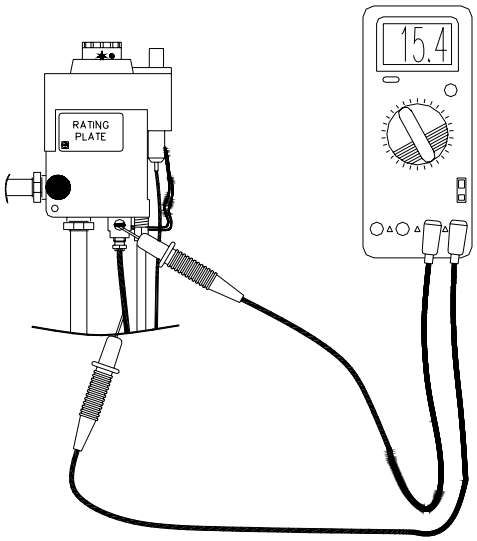
Test 2

Isolate power before conducting test

Disconnect the thermocouple from the gas control and using a multimeter set on the DC millivolt scale measure the voltage being generated by the thermocouple.

Normal voltage should be approximately 20 millivolts.

Note: It will be necessary to light the pilot and manually hold the gas control knob down during this test.



Test 3

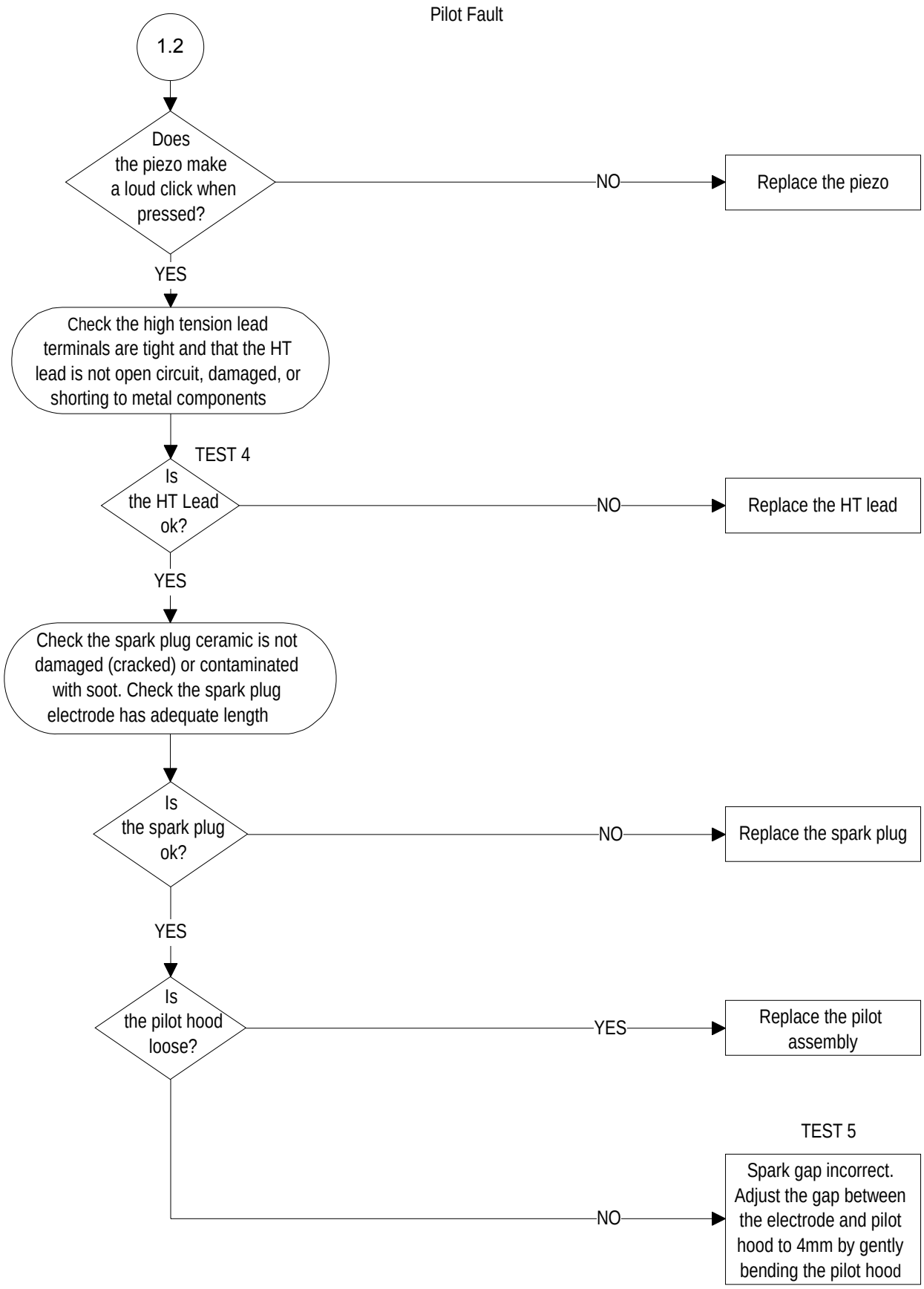
Isolate power before conducting test

With the thermocouple connected to the gas control and using a multimeter set on the DC millivolt scale, measure the voltage between the lower terminal of the interrupter block and the thermocouple sheath.

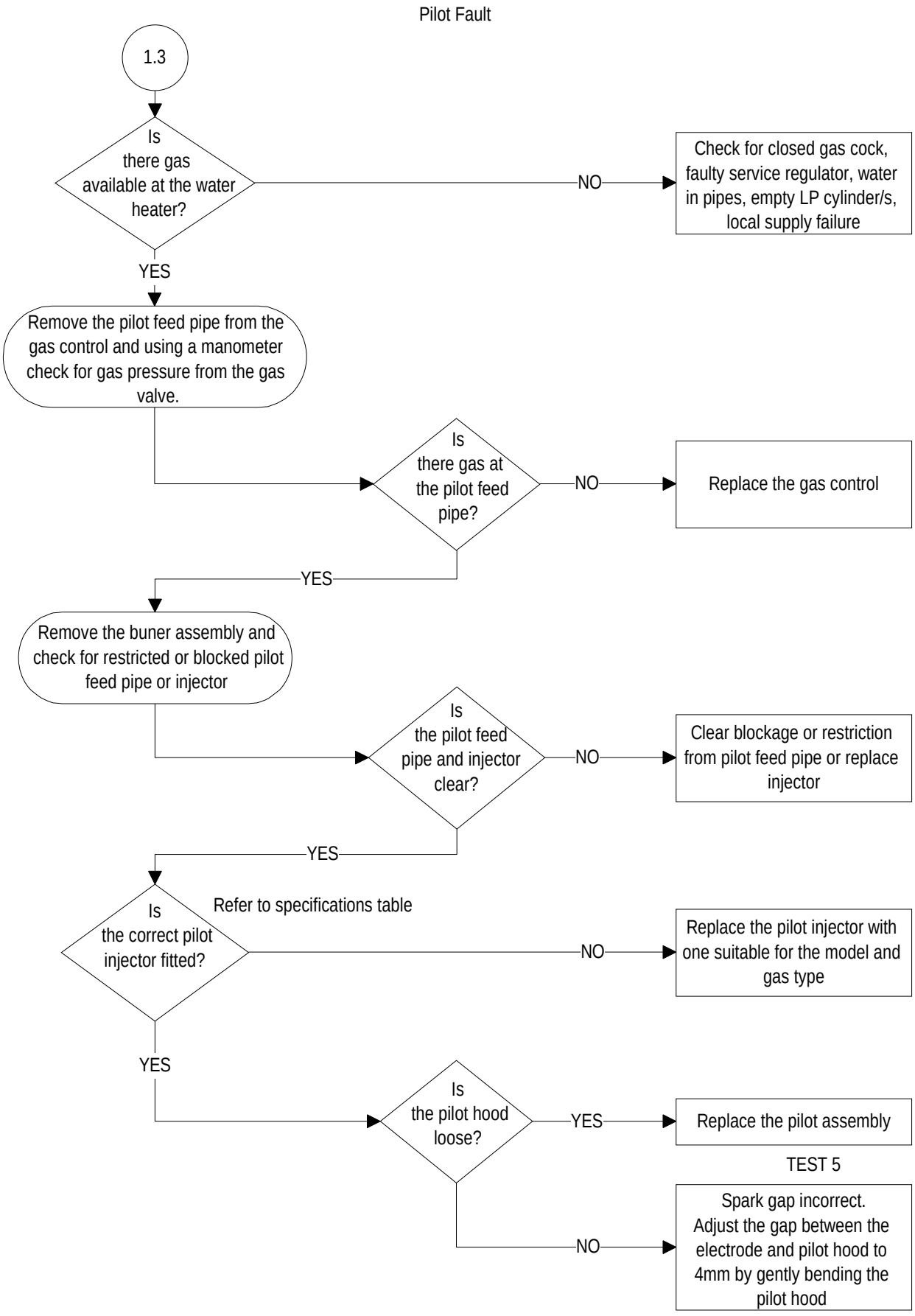
The reading should be approximately 14 millivolts.

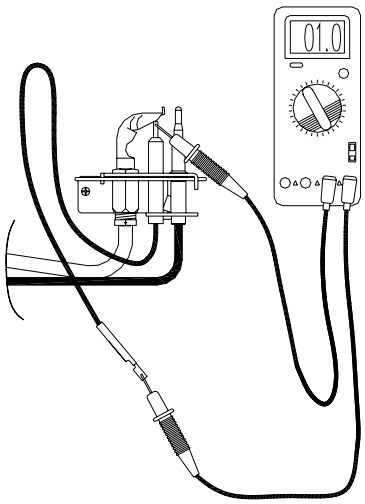
Note: The pilot must be lit to conduct this test.

Fault Finding Chart 1.2



Fault Finding Chart 1.3





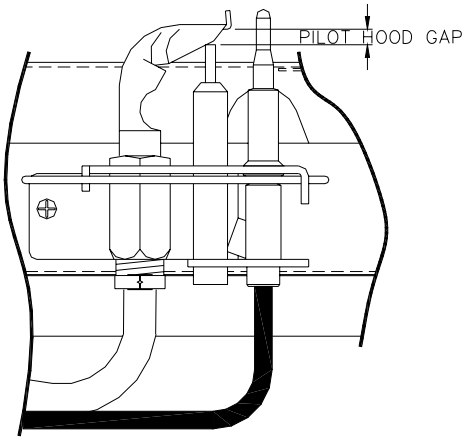
Test 4

Isolate power before conducting test

Remove the burner (refer to procedure 11 on page 44

Using a multimeter set on the x1 resistance scale, measure the resistance between the wiring terminal and the electrode tip (ensure the tip is clean).

Resistance should be less than 1 ohm.



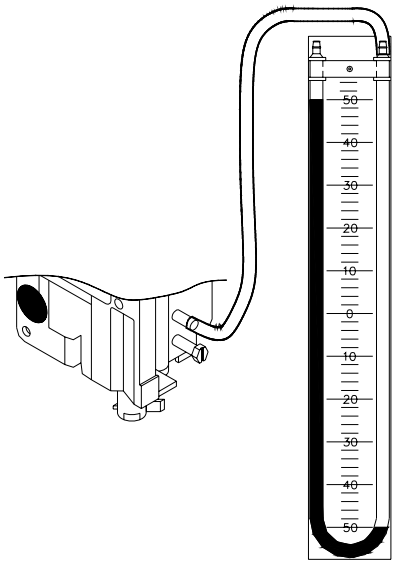
Test 5

Isolate power before conducting test

Remove the burner (refer to procedure 11 on page 44

The gap between the pilot hood and electrode tip should be between 4 and 5 mm.

Gently bend the pilot hood to adjust the spark gap.



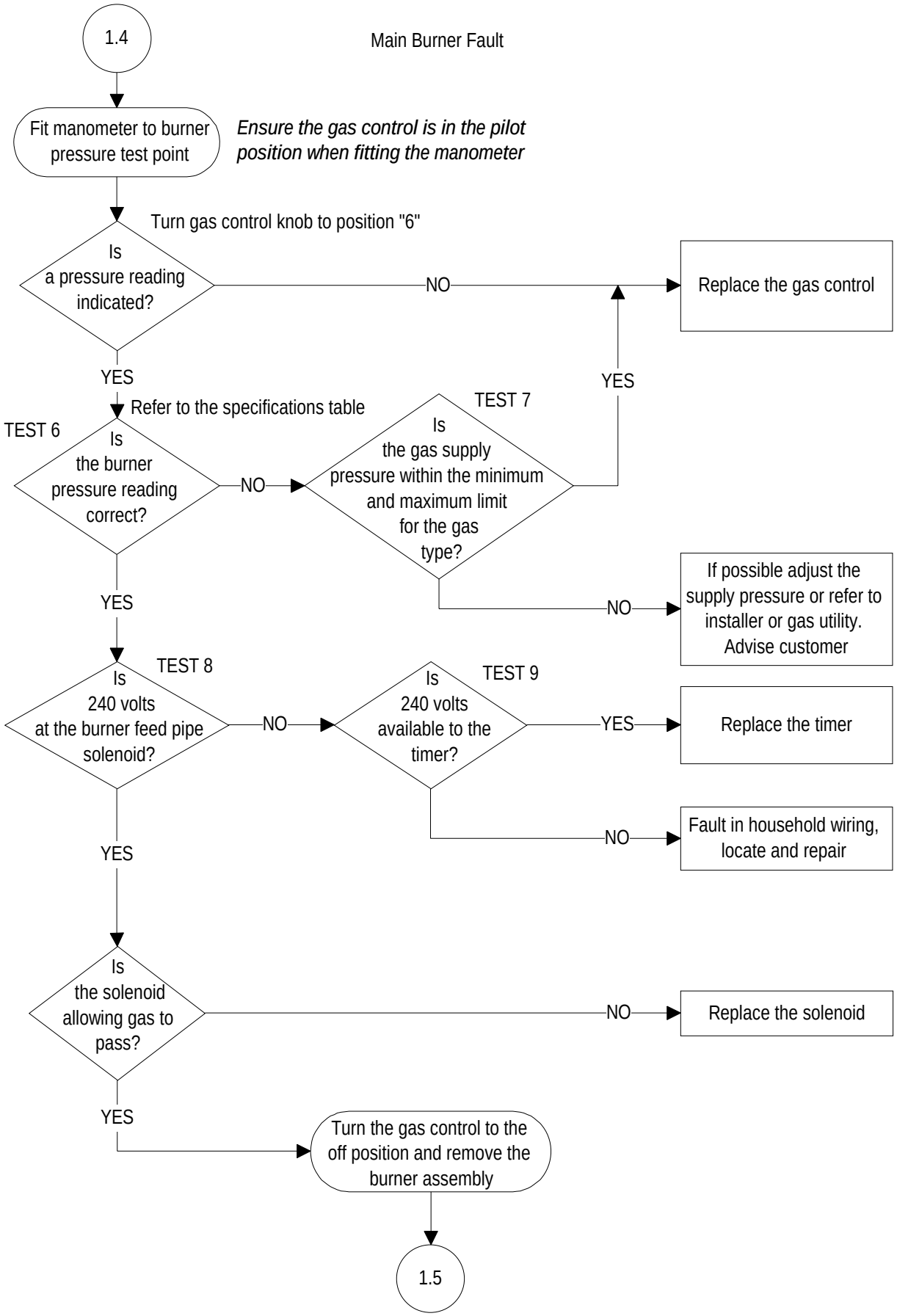
Test 6

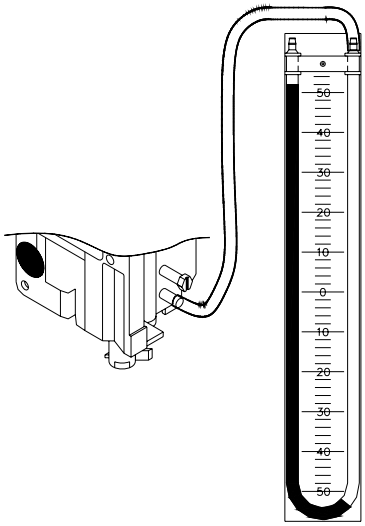
Live components exercise caution to prevent electric shock when conducting this test.

Note: Activate the solenoid by pressing the 'MAN' button on the timer.

Burner gas pressure reading with the burner lit should be: 1kPA for natural gas, 2.75kPa for propane gas, 2.70kPa for butane gas +/- 20%

Fault Finding Chart 1.4



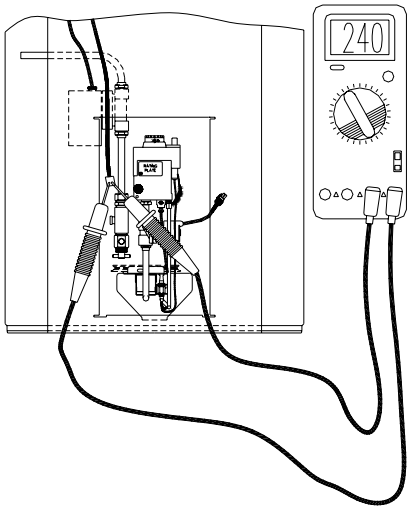


Test 7

Live components exercise caution to prevent electric shock when conducting this test.

Fit manometer to static pressure test point. With all gas burning appliances lit, including the water heater, the static test point pressure should be a minimum of 1.13kPa for natural gas, 2.75kPa for LP gas and 2.75kPa for butane gas.

Changing the gas valve or attempting to over-gas the burner pressure will not rectify a fault caused by insufficient line pressure.



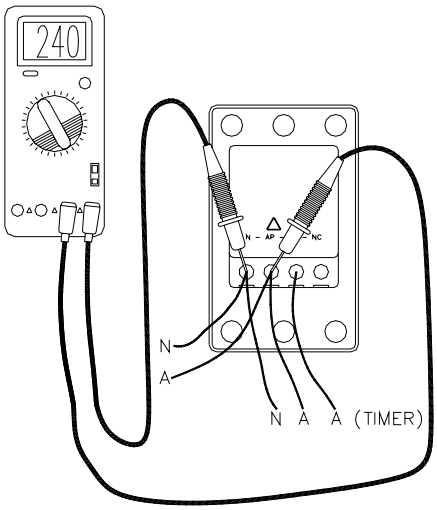
Test 8

Live components exercise caution to prevent electric shock when conducting this test.

Disconnect the 2-pin plug to the burner feed pipe solenoid. Press the “MAN” button on the timer.

Using a multimeter on the AC voltage scale, measure the voltage at the plug.

Normal voltage should be approximately 240 volts. Press the “MAN” button again to turn the booster off, and reconnect the 2-pin plug.



Test 9

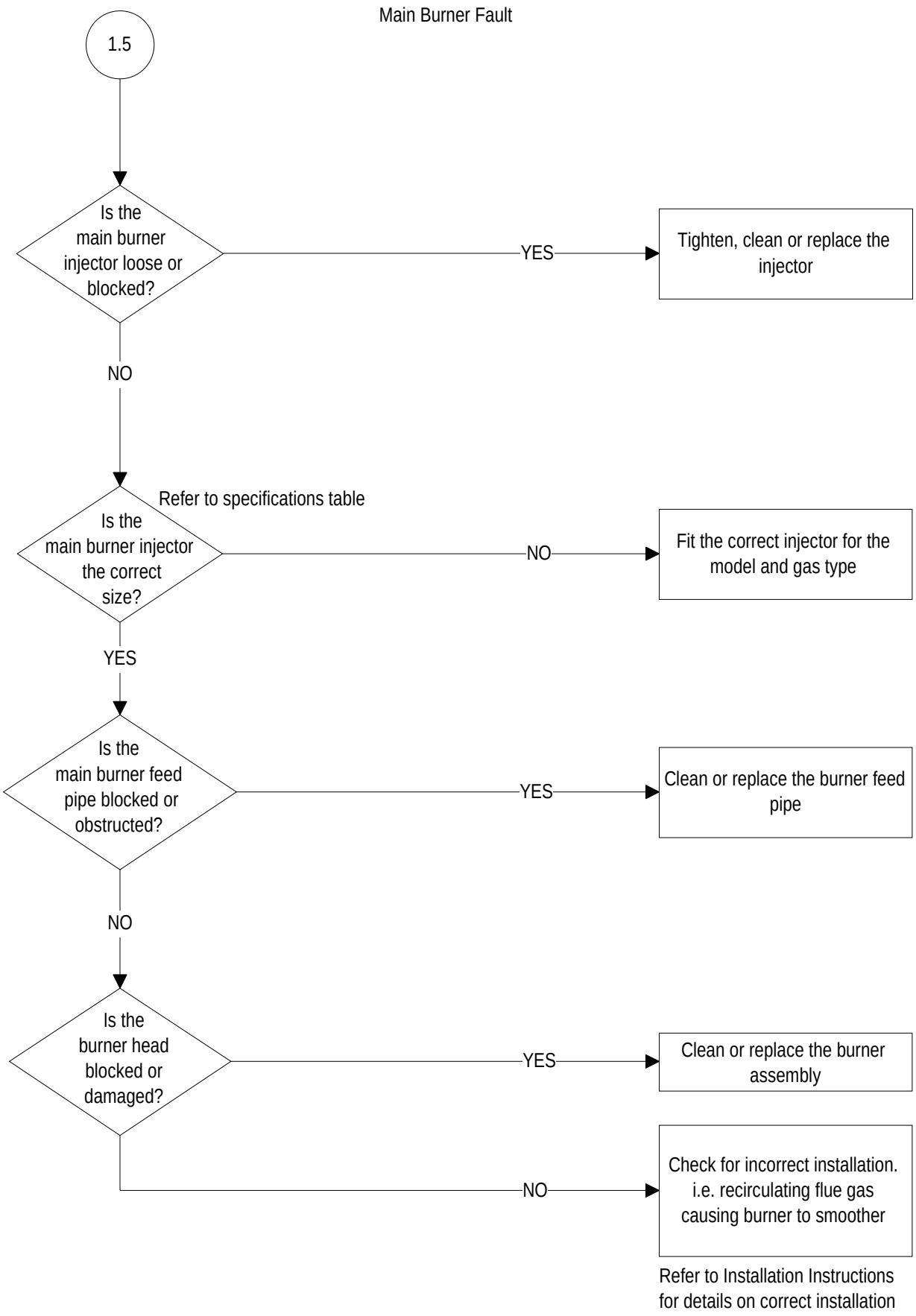
Live components exercise caution to prevent electric shock when conducting this test.

Remove the timer from the wall.

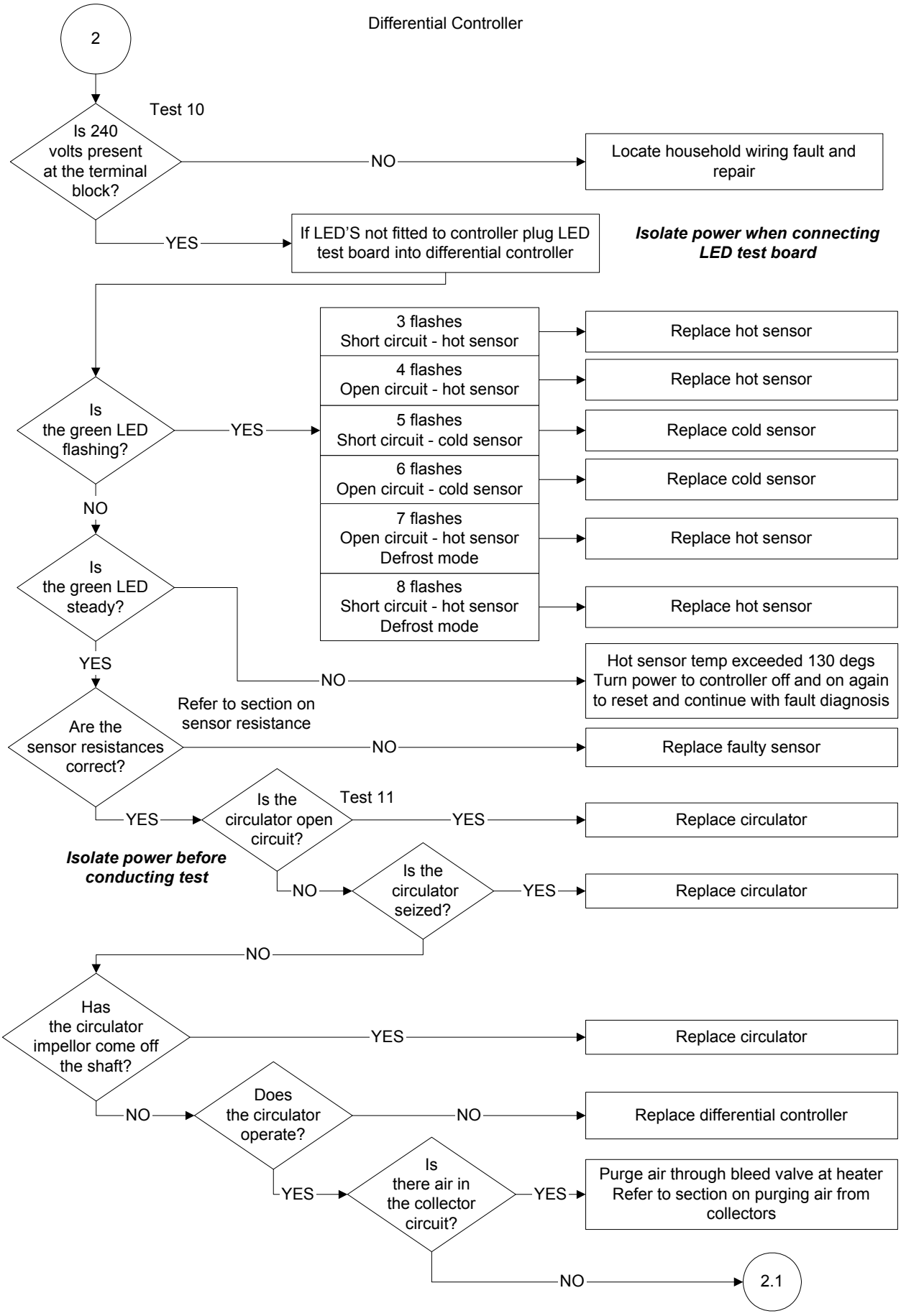
Using a multimeter set on the AC voltage scale, measure between terminals “N” and “A/P”.

Normal voltage should be 240 volts.

Fault Finding Chart 1.5

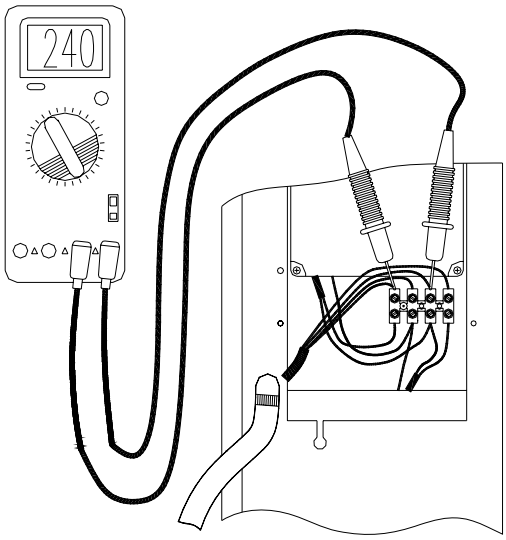


Fault Finding Chart 2



Component Tests 10 & 11

Test 10



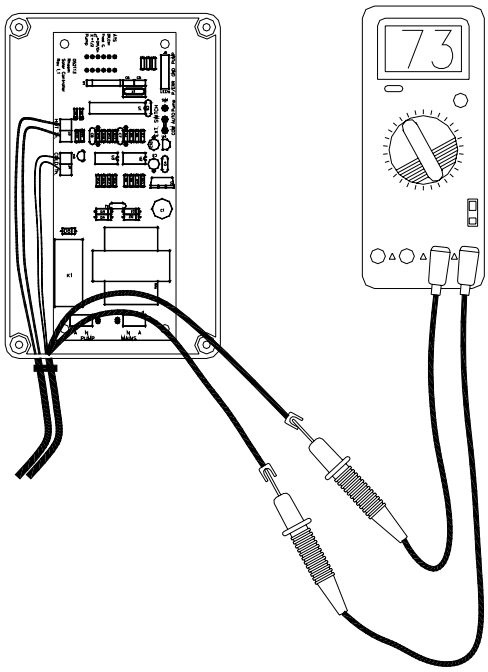
Live components exercise caution to prevent electric shock when conducting this test.

Remove the side access door.

Using a multimeter set on the AC voltage scale, measure between terminals “N” and “A”.

Normal voltage should be 240 volts.

Test 11



Isolate power before conducting test

Remove the side access door and the cover from the weatherproof enclosure.

Disconnect the wiring to the pump from the PCB.

Using a multimeter on the x1 resistance scale, measure the resistance of the pump motor.

Normal resistance is 73 ohms +/- 5%.

Differential Controller

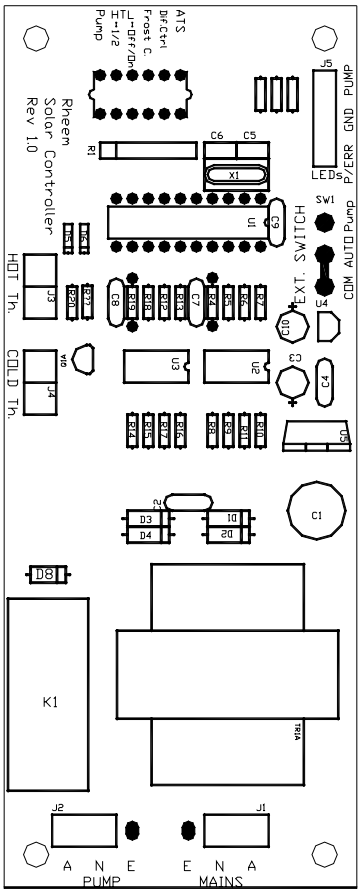
The differential controller receives information from the hot sensor, measuring water temperature at the collectors, and the cold sensor measuring water temperature at the bottom of the tank.

If the water temperature at the hot sensor is 8ºC above the temperature being sensed by the cold-water sensor the differential controller turns a circulator pump on.

The circulator moves the colder water in the tank up to the collectors for heating via the cold pipe and the heated water in the collectors down to the tank via the hot pipe.

When the temperature difference between the hot and cold sensors falls to within 4ºC the differential controller turns the circulator pump off.

The differential controller will not allow the circulator pump to turn on if the temperature sensed by the cold sensor is 70ºC or higher unless the controller is in heat dump mode.



This prevents the likelihood of extremely hot water being delivered at hot taps and other outlets at uncontrolled water temperatures near boiling point.

It also prevents premature operation of the gas control energy cut out (ECO) and T&PR valve and aids in extending the life of the system. Recirculation will recommence once the temperature at the cold sensor falls below 50ºC.

During periods of frost if the hot water sensor mounted in the collector hot pipe senses a temperature of 4ºC the differential controller will turn the circulator on to allow water to pass through the collector array.

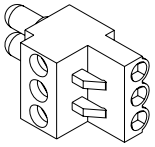
This flow of water will prevent the DN15 pipe work to and from the collector/s from freezing.

Recirculation ceases when the hot sensor detects a temperature of 6ºC and the circulator has run for at least 400 seconds.

Heat Dump Mode - If the temperature detected by the cold sensor is over 70°C the circulator may run if the temperature detected by the hot sensor is over 130°C. Operation ceases when either the detected temperature of the hot sensor drops below 110°C or the temperature detected by the cold sensor rises above 80°C.

The differential controller has built in diagnostics to test the condition of the hot and cold sensors.

On early models a 3pin plug on the differential controller circuit board allows two LED'S to be connected (part number 890258) so the fault codes can be displayed, on later models the differential controller has the LEDS fitted.



The red LED indicates when power is being supplied to the circulator pump. The green LED displays the fault codes. On later models the LED'S are permanently mounted on the PCB.

Differential Controller Fault Codes

Nº of flashes (Green LED)	Fault	Mode
LED Steady	No faults detected	Normal
LED out	Collector temperature has exceeded 130°C	Normal
1	Not assigned	N/A
2	Not assigned	N/A
3	Hot sensor short circuited	Normal
4	Hot sensor open circuit	Normal
5	Cold sensor short circuited	Normal
6	Cold sensor open circuit	Normal
7	Hot sensor open circuit	Defrost
8	Hot sensor short circuited	Defrost

Sensor Resistance

The differential controller can detect if a temperature sensor is open circuit or short circuit however it is possible for the sensor resistance to drift out of tolerance.

This can cause the circulator to run continuously or not run at all.

In addition to the checking the status of the sensors indicated by the differential controller the resistance of the sensors should also be checked.

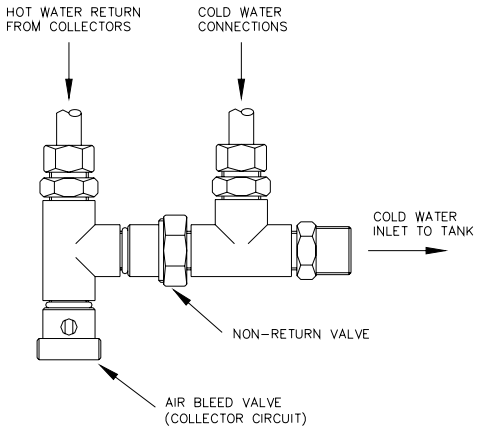
The table opposite sets out the resistance of the sensors for a given water or air temperature.

Temperature Degrees C	Resistance (Hot & Cold Sensor) Kilo-ohms
0	23.73
10	15.45
20	10.31
30	7.037
40	4.905
50	3.485
60	2.521
70	1.853
80	1.384

Purging Air from the Collectors

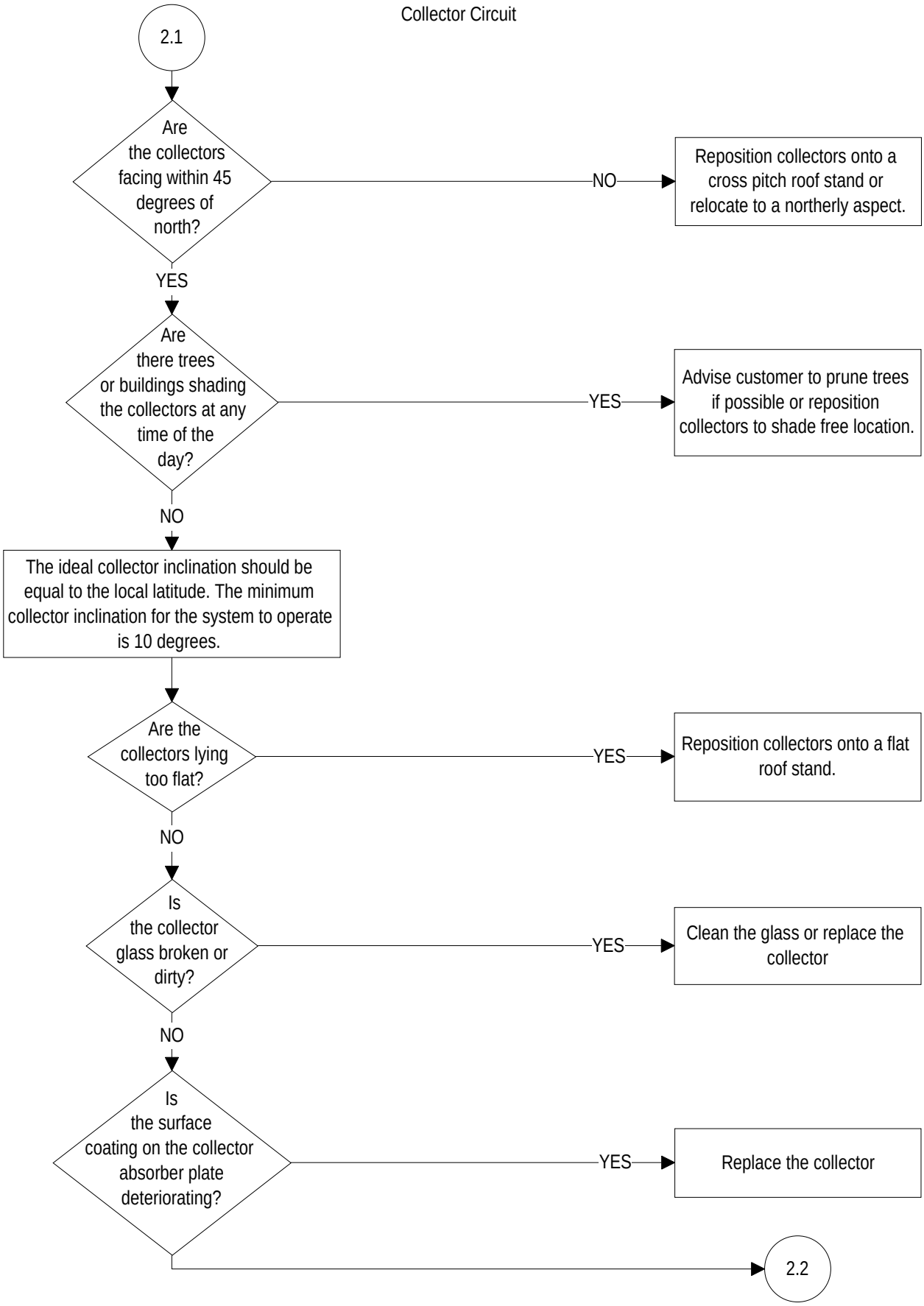
An air eliminator is not fitted to the sequential freeze collector system. Upon completion of any repairs to the collectors, circulator pump, pipe work to and from the collectors or recommissioning (if the tank has been drained) it will be necessary to purge the air from the collector circuit. To purge air from the collector circuit ensure the tank is full of water and that all hot taps are turned off. Using a flat blade screwdriver open the bleed valve fitted at the “tee” where the hot water pipe from the collectors is connected at the water heater (see diagram opposite). The mains pressure will force cold water to flow from the tank through the circulator up the cold pipe through the collectors and back down the hot pipe. Close the bleed valve when water runs freely without the presence of air.

Inlet Plumbing Configuration

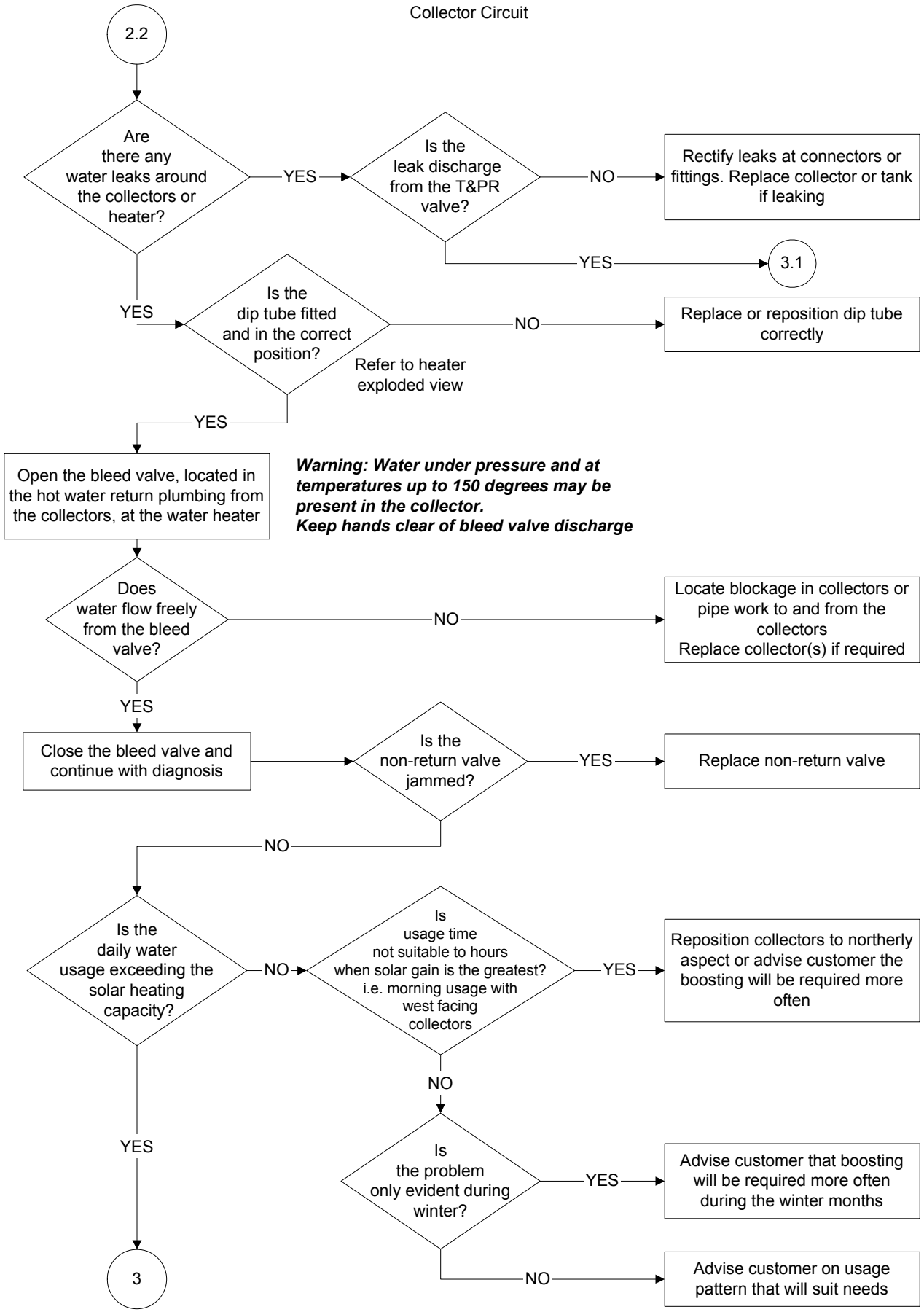


Water under pressure and up to 150ºC may be expelled through the bleed valve during the purging process; keep hands and face well clear to prevent burns or scalds.

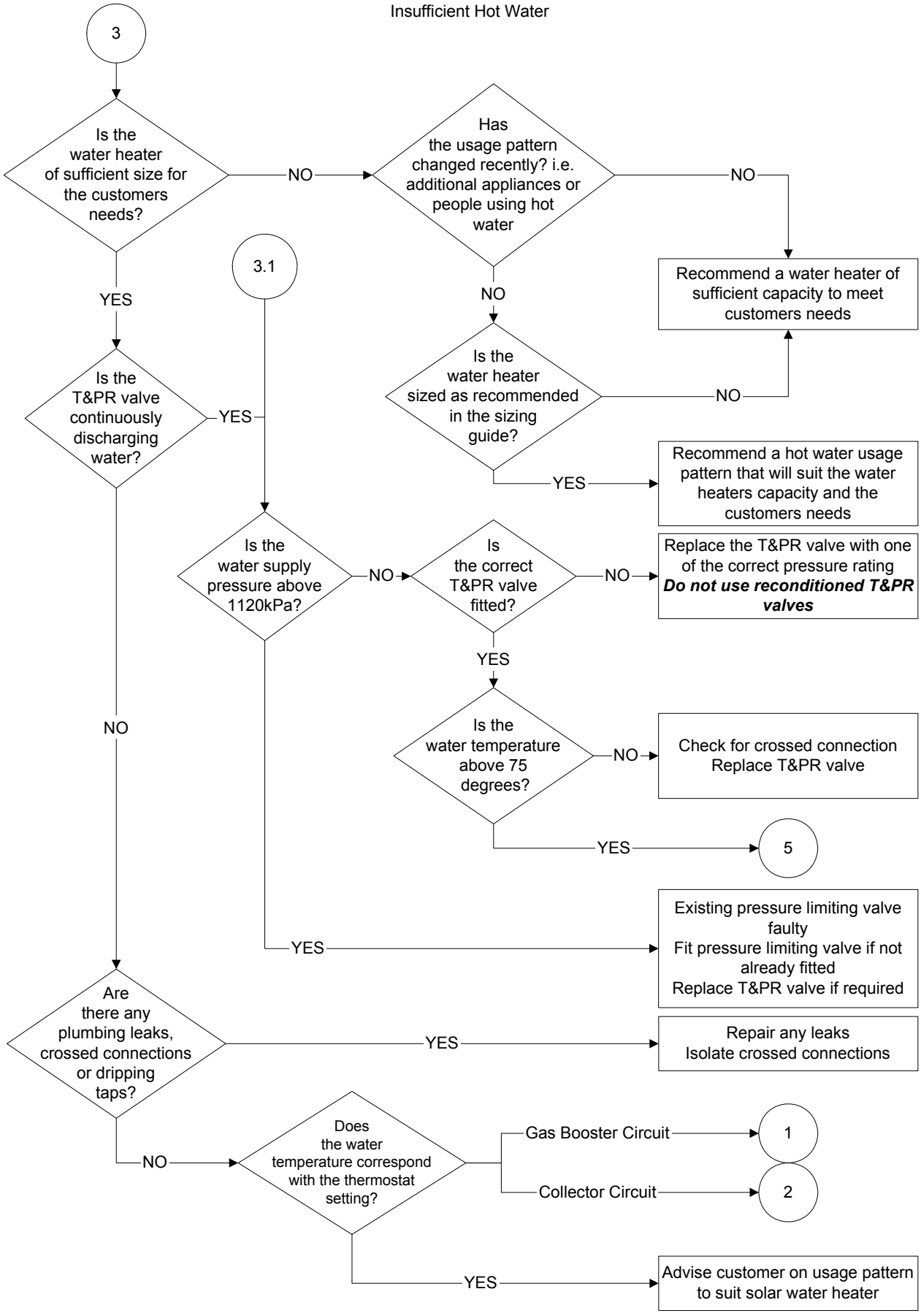
Fault Finding Chart 2.1



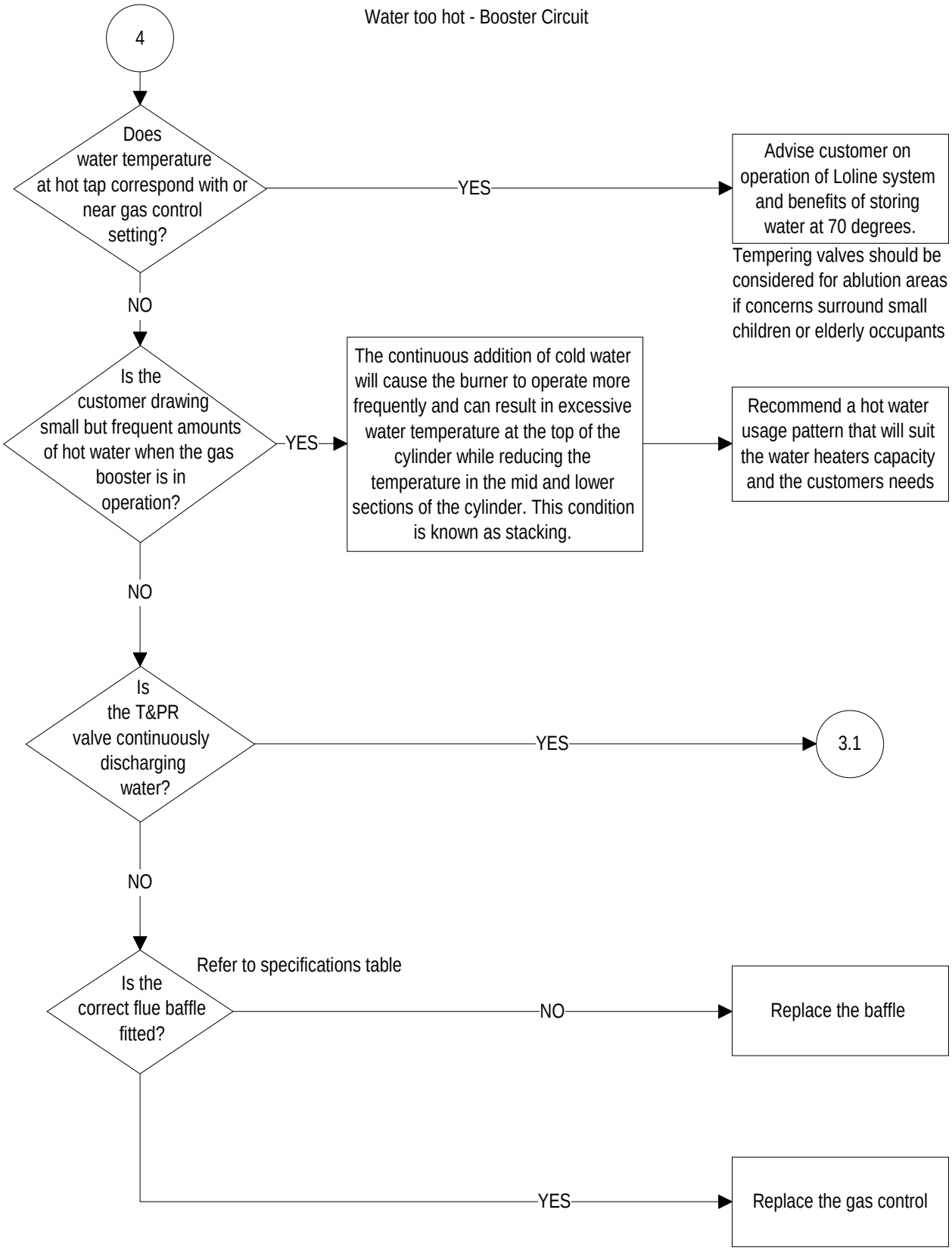
Fault Finding Chart 2.2



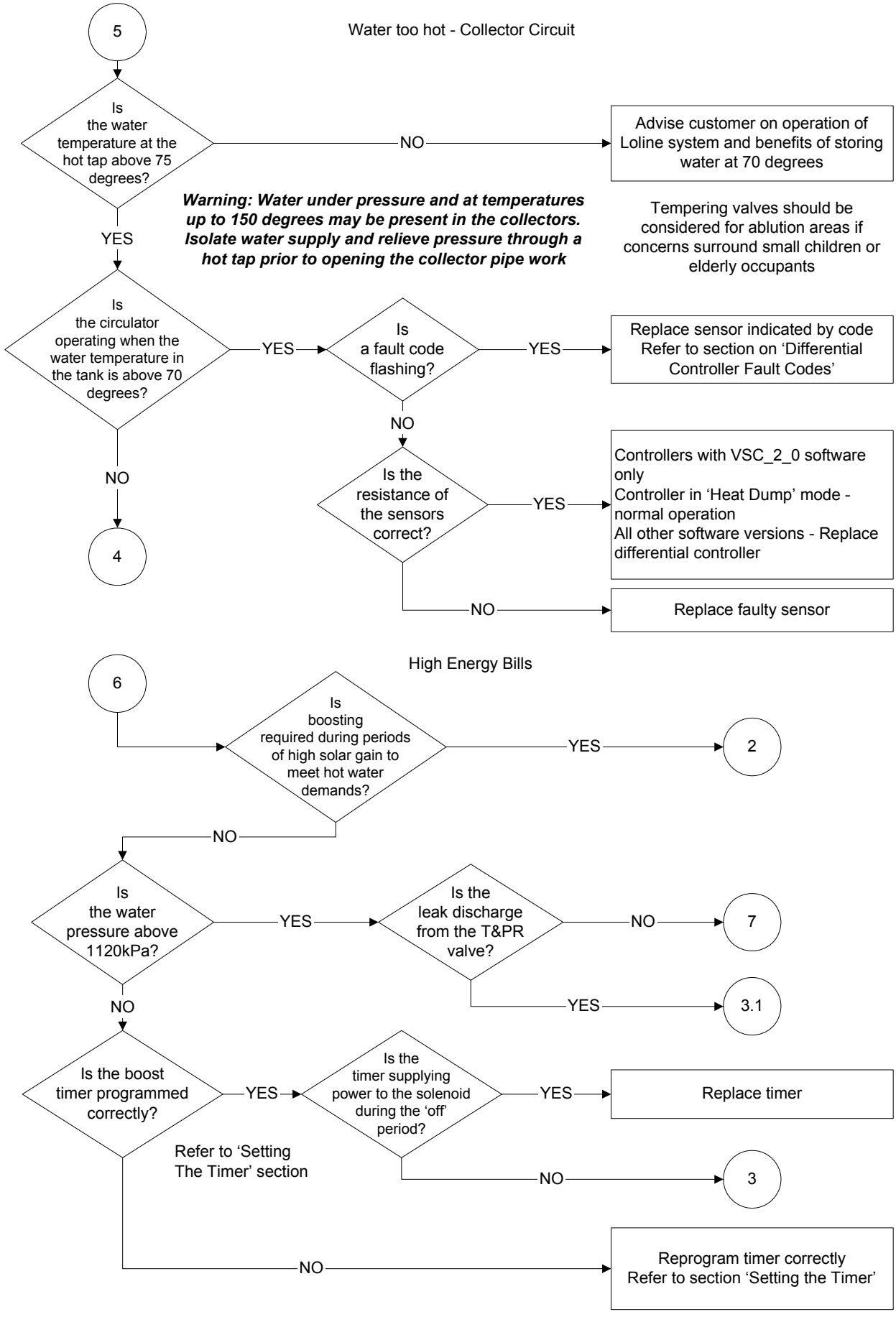
Fault Finding Chart 3



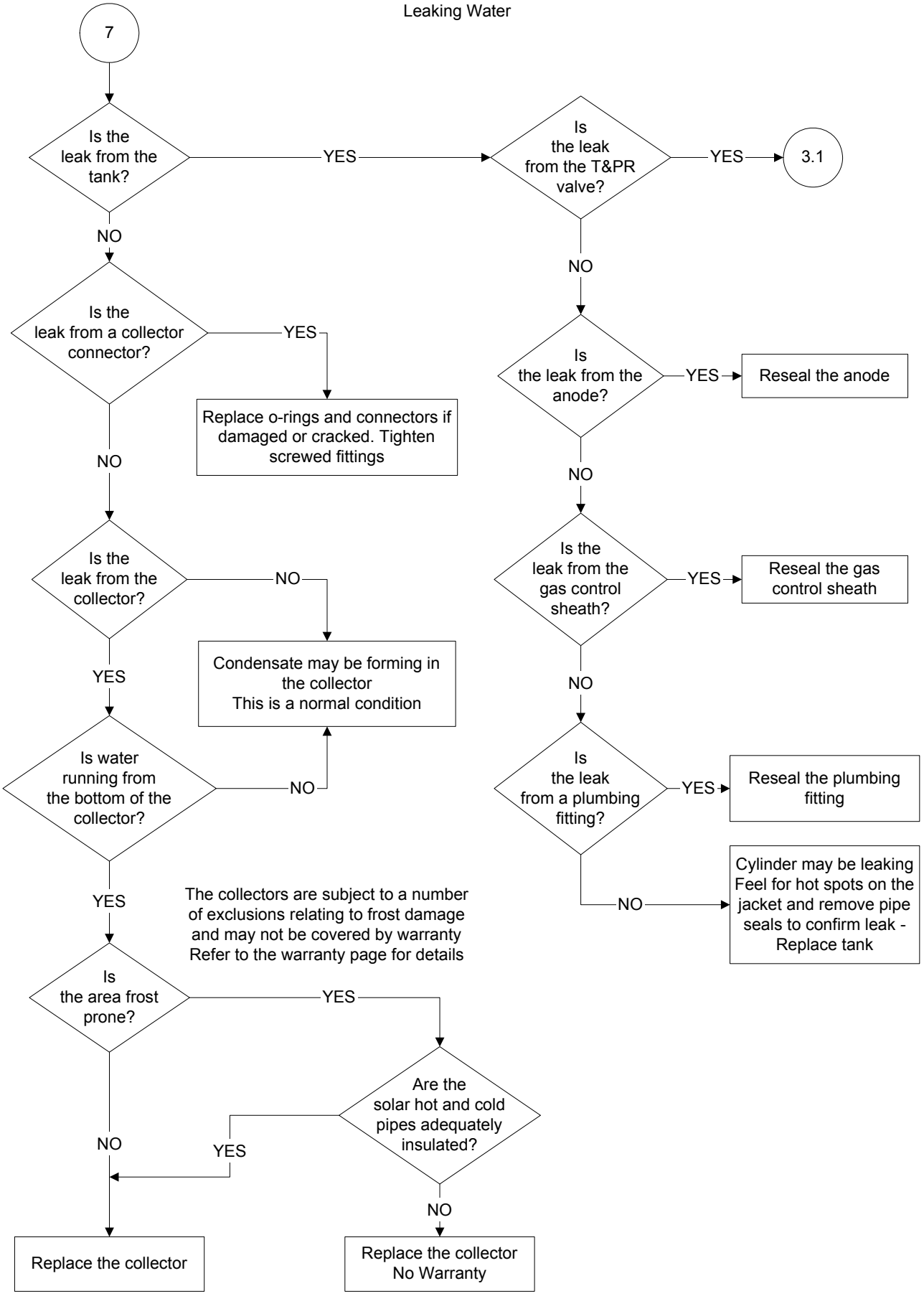
Fault Finding Chart 4



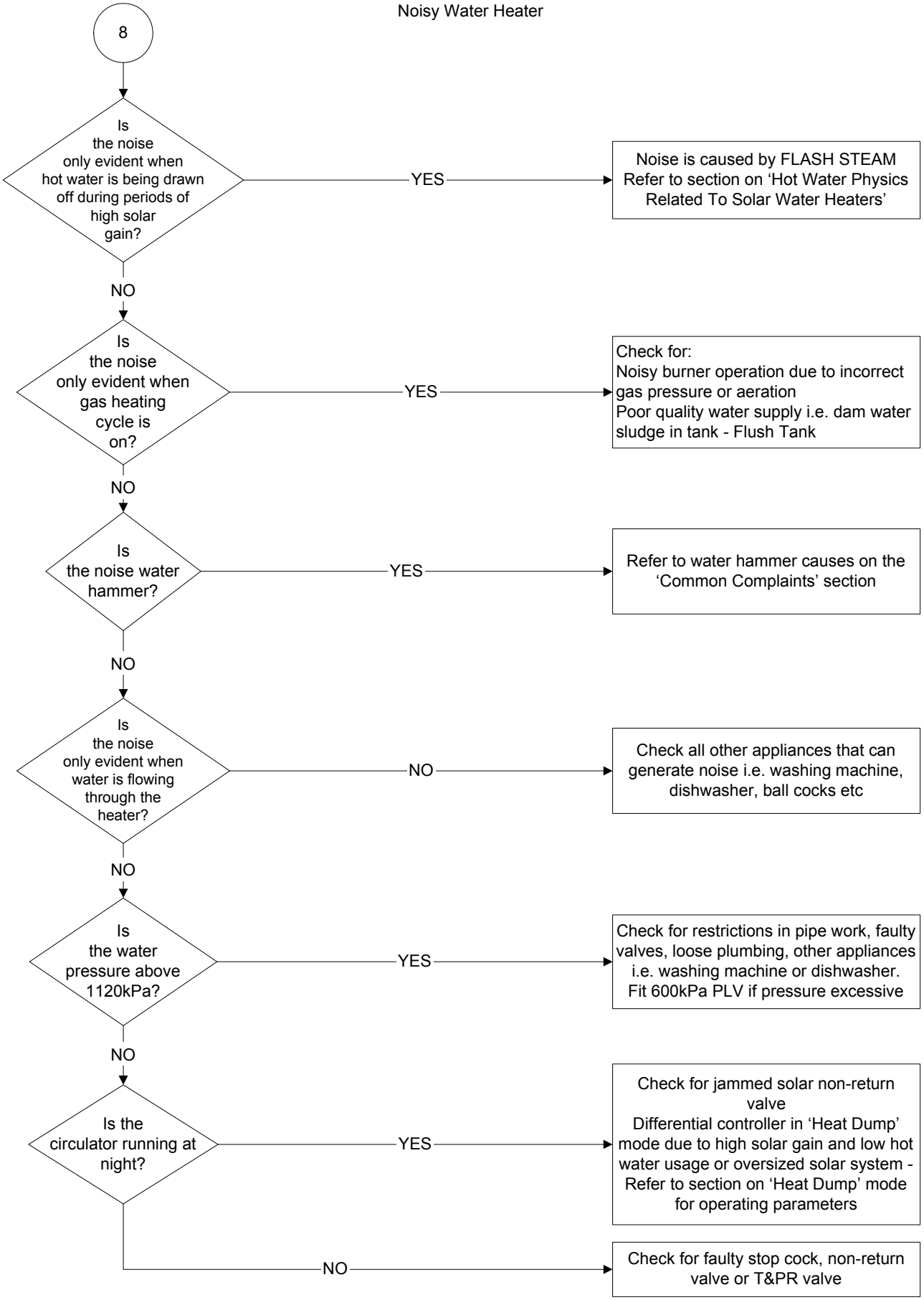
Fault Finding Charts 5 and 6



Fault Finding Chart 7



Fault Finding Chart 8



Component Replacement

Draining the Water Heater (Procedure 1)

1. ***Isolate the power, water and gas supplies to the water heater.***
2. ***Relieve pressure from the water heater through the temperature and pressure relief valve or a hot tap.***
3. Open the drain cock located inside the front access door.
4. Open the temperature and pressure relief valve to allow air into the system.

Removing or Replacing a Solar Collector (Procedure 2)

Water under pressure and at temperatures up to 150ºC may be present in the collectors. Isolate water supply and relieve pressure through a hot tap or the temperature and pressure relief valve prior to opening the collector pipe work. Protective clothing should be worn to prevent scalding or burns.

15. ***Isolate the water and power supplies to the water heater***
16. ***Relieve pressure from the water heater through the temperature and pressure relief valve or a hot tap.***
17. Disconnect the hot and cold pipes to the collectors at the water heater and cap the connections to the water heater. The collectors will now drain down.
18. Remove the retaining clips and spring clip/s from the collector connectors and end caps. The hot or cold pipe can now be disconnected from the collector by pulling the connector off the collector pipe.
19. Remove the retaining clips and spring clips from the inter-connectors at the top and bottom of the collector.
20. Remove the screws retaining the collector to the angle bracket, disconnect the retaining strap at the top of the collector, slide the collector out and remove to ground level.
21. Reassemble in reverse order of above.
22. Once reassembly is complete, restore the water supply.
23. Using a flat blade screwdriver, open the bleed valve near the cold-water inlet to the water heater to allow water to enter the collector circuit. Refer to page 31.
24. Close the bleed valve when water runs freely without the presence of air.
25. Open all the hot taps in the premises to allow air to be expelled from the pipe work and cylinder. As the water runs freely from each tap, close it.
26. Restore the power supply to the gas booster circuit and the differential controller circuit.

Removing / Replacing Flue Terminal Assembly (Procedure 3)

1. Remove access cover.
2. ***Turn the gas control to the off position; note the current gas control setting.***
3. Remove the 4 holding screws from the flue terminal assembly.
4. Gently remove assembly from the jacket.
5. Reassemble in reverse order of above.
6. Relight pilot, and set gas control to position noted in step 2. ***Lighting instructions are provided on the access door, follow the instructions carefully.***

Differential Controller (Procedure 4)

1. ***Isolate power supply to the water heater.***
2. Remove the access cover on the left hand side of the air duct.
3. Disconnect the wiring to the pump. (Note: Mark the wires to ensure correct rewiring during reassembly.)
4. Disconnect the power supply wiring. (Note: Mark the wires to ensure correct rewiring during reassembly.)
5. Disconnect the hot and cold sensor wires. (Note: Mark the sensor wires to ensure correct rewiring during reassembly)
6. Using a pair of long nose pliers gently release the 4 clips retaining the circuit board and remove the board.
7. Reassemble in the reverse order of above; ensuring all wiring is connected correctly.
8. Refit the side access cover.
9. Restore the power supply.

Anode (Procedure 5)

Under normal conditions the anode may not be replaced. To inspect the anode or change the anode to match the water quality in the area.

1. ***Remove the access cover and turn gas control knob to the off position.*** Note number to which knob was set.
2. ***Isolate water supply at the stopcock.***
3. ***Relieve pressure through a hot tap or the relief valve.***
4. Remove the flue terminal. Refer to procedure 3.
5. Remove the jacket top, and the insulation blanket.
6. Using a 27mm tube or socket spanner, unscrew and remove the anodes.
7. Apply thread seal tape to anodes, refit and tighten.
8. Restore water supply and test for leaks.
9. Refit jacket top and flue terminal.
10. Relight the pilot. ***Lighting instructions are provided on the access door, follow the instructions carefully.***
11. Turn the gas control to the setting noted in step 1 and refit access cover.

Circulator (Procedure 6)

Warning: The collectors may be at stagnation temperature, water under pressure and at temperatures up to 150ºC may be present. Exercise caution to prevent burns or scalds.

1. ***Using a flat blade screwdriver open the bleed valve (refer to diagram on page 31) and purge water through the collectors to dissipate excess temperature.***
2. Close the bleed valve once excess temperature is removed.
3. ***Isolate the power and water supplies to the water heater.***
4. ***Relieve pressure from the water heater through the temperature and pressure relief valve or a hot tap.***
5. Close the relief valve or hot tap.
6. At the water heater inlet pipe work, disconnect the hot pipe from the collectors at the 4 way tee and cap the tee using a ½" cap. Refer to diagram on page 31.
7. Remove the front and side access covers.
8. Disconnect the wiring to the circulator at the differential controller PCB.
9. Undo the large brass nut retaining the circulator motor to the body and remove the circulator motor. It will be necessary to slide the motor down past the gas supply pipe to remove.

   Extremely hot water may be present in the pump; protective clothing should be worn to prevent scalds or burns.
10. Remove the Philips head screw from the circulator head and unclip the top cover.
11. Loosen the cable entry gland, disconnect the wiring from the circulator motor and remove.
12. Reconnect the wiring to the replacement circulator.
13. Reassemble in the reverse order of above. Note: The circulator body rarely requires replacing, the new body will only need to be replaced if the existing unit is damaged or fouled with scale. Refit the side access cover.
14. Restore the water supply.
15. Using a flat blade screwdriver, open the bleed valve near the cold-water inlet to the water heater to allow water to enter the collector circuit. Refer to page 31
16. Close the bleed valve when water runs freely without the presence of air.
17. Open all the hot taps in the premises to allow air to be expelled from the pipe work and cylinder. As the water runs freely from each tap, close it.
18. Restore the power supply to the gas booster circuit and the differential controller circuit.
19. Refit the front access cover.

Hot Sensor (Procedure 7)

The collectors may be at stagnation temperature, water under pressure and at temperatures up to 150ºC may be present. Protective clothing should be worn to prevent burns or scalds.

1. ***Isolate the water and power supplies to the water heater***
2. ***Relieve pressure from the water heater through the temperature and pressure relief valve or a hot tap.***
3. Remove the spring clip retaining the hot sensor in the connector and remove the sensor.
4. Fit the replacement sensor into the connector and secure with the spring clip. Ensure the clip retains the locating washer. Note: Take care not to damage the o-ring when fitting the replacement sensor.
5. Cut the wiring to the existing sensor and connect to the replacement sensor. Ideally this connection should be made in the roof space. If the connection is to be made on the roof, ensure the connection is water and UV proof.
6. Restore the water supply.
7. Using a flat blade screwdriver, open the bleed valve near the cold-water inlet to the water heater to allow water to enter the collector circuit. Refer to page 31.
8. Close the bleed valve when water runs freely without the presence of air.
9. Open all the hot taps in the premises to allow air to be expelled from the pipe work and cylinder. As the water runs freely from each tap, close it.
10. Restore the power supply.

Cold Sensor (Procedure 8)

1. ***Isolate the water and power supplies to the water heater***
2. ***Relieve pressure from the water heater through the temperature and pressure relief valve or a hot tap.***
3. Remove the front and side access covers.
4. Disconnect the cold-water sensor wiring from the PCB.
5. Connect the replacement sensor wiring and feed the sensor down inside the air duct.
6. Refit the side access door.
7. Remove the spring clip retaining the cold sensor in the “tee”, and remove the sensor. Note: Take care not to damage the o-ring when fitting the replacement sensor.
8. Fit the replacement sensor into the “tee” and secure with the spring clip. Ensure the clip retains the locating washer.
9. Restore the water and power supplies.

Temperature and Pressure Relief Valve (Procedure 9)

Never fit a T&PR valve with a rating higher than that indicated on the water heater rating plate. Do not use reconditioned T&PR valves.

1. ***Isolate the power and water supplies to the water heater.***
2. ***Relieve pressure from the water heater through the temperature & pressure relief valve.***
3. Drain water from the water heater through a hot tap.
4. Remove the drain line from the T&PR valve.
5. Unscrew the T&PR valve and remove. ***Note: Hot water will discharge from the T&PR valve outlet during removal. Protective clothing should be worn to prevent scalds or burns.***
6. Refit the replacement T&PR valve using Teflon tape. Note warnings above.
7. Refit the drain line.
8. Close the hot tap and restore water supply.
9. Check T&PR valve thread for leaks.
10. Operate the T&PR valve lever to reset relief drain.
11. Purge air from the system through hot taps.
12. Restore the power supply.

Gas Control Only (Procedure 10)

1. Remove the access door and turn the gas control knob to the off position. Note number to which knob was set.
2. ***Isolate the gas and power supplies.***
3. Disconnect the gas line at the gas control.
4. Disconnect the pilot feed pipe, burner connecting pipe, igniter lead and thermocouple.
5. Remove the screw retaining the plastic cover to the gas control; remove the plastic cover and igniter.
6. Release the spring clip and withdraw the control from the sheath.
7. Reassemble in reverse order of above.
8. Restore gas and power supplies. ***NOTE: Test for gas leaks after reconnecting gas connection using soapy water solution.***
9. Relight the pilot. ***Lighting instructions are provided on the access door, follow the instructions carefully.***
10. Set the gas control to the position noted in step 1.
11. ***Test for gas leaks at all unions using soapy water solution.***

Gas Control and Burner Assembly (Procedure 11)

1. Remove the access door and turn the gas control knob to the off position. Note number to which the knob was set.
2. ***Isolate the gas and power supplies.***
3. Disconnect the gas line at the gas control.
4. Disconnect the wiring to the burner feed pipe solenoid.
5. Remove holding screw from the burner-mounting bracket.
6. Remove the screw retaining the plastic cover to the gas control; remove the plastic cover and igniter.
7. Release the spring clip and withdraw the gas control and burner assembly.
8. Reassemble in reverse order of above.
9. Restore gas and power supplies. ***NOTE: Test for gas leaks after reconnecting gas connection using soapy water solution.***
10. Relight the pilot. ***Lighting instructions are provided on the access door, follow the instructions carefully.***
11. Set the gas control to the position noted in step 1.
12. ***Test for gas leaks at all unions using soapy water solution.***

Burner Solenoid Valve (Procedure 12)

1. ***Isolate the power supply to the water heater.***
2. Remove the access cover.
3. ***Turn the gas control knob to the "off" position.*** Note the current gas control setting.
4. ***Isolate the gas supply to the water heater.***
5. Disconnect the wiring to the solenoid at the 2-pin plug.
6. Remove the earth wire from the solenoid.
7. Disconnect the upper burner feed pipe from the gas valve. Unscrew the upper burner feed pipe from the solenoid.
8. Unscrew the solenoid from the lower burner feed pipe.
9. Reassemble in reverse order of above. ***Note: Ensure earth wire is reconnected to the solenoid and that all pipe connections are gas tight.***
10. Restore gas supply and light pilot. ***Lighting instructions are provided on the access door, follow the instructions carefully.***
11. Set the gas control to the position noted in step 1.
12. Restore the power supply and press the "MAN" button on the timer.
13. ***Test for gas leaks using soapy water solution.***
14. Refit the access cover.

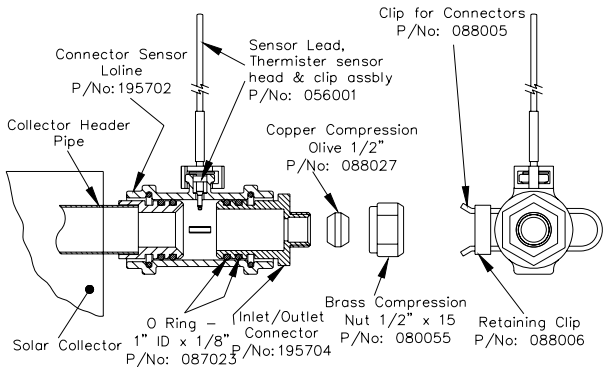
Collector Connectors (SCT/SBT Collectors)

The SCT/SBT series collectors utilize a new method for connecting the collectors together and for coupling the hot and cold pipes to the collector.

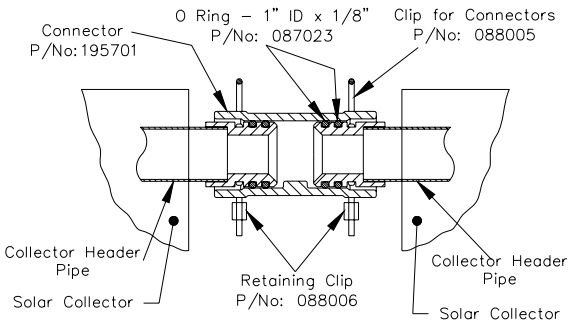
The collector header pipes have 3 slots machined into the pipe end to locate 2 o-rings and a stainless steel retaining clip.

A connector or end cap manufactured from PPS is then slipped over the o-rings and retained by a stainless steel spring clip.

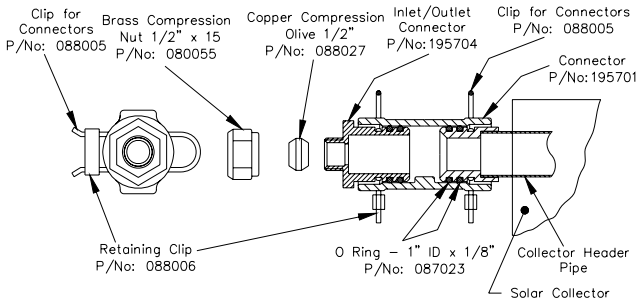
The spring clips are secured closed via a retaining clip placed around the legs. An adapter is fitted into the connector to allow connection of the hot and cold pipes via a ½" nut and olive.



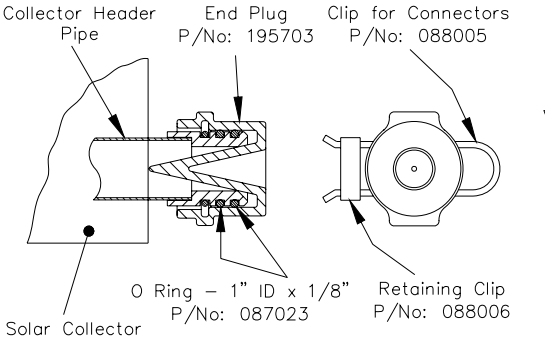
Connector with sensor well



Connector



Adapter



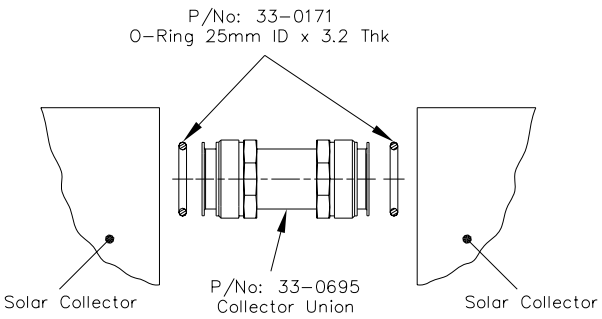
End Cap

Collector Connectors (NPT Collectors)

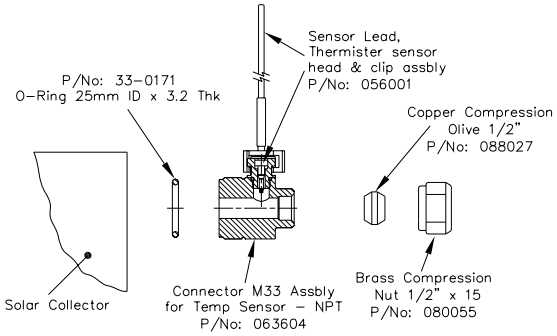
The NPT series collectors utilize the traditional method for connecting the collectors together and for coupling the hot and cold pipes to the collector.

An o-ring is inserted into the collector header pipe, a connector or blanking disc is then inserted into the header pipe and retained via a nut which is screwed into place sealing the connector or blanking disc against the o-ring.

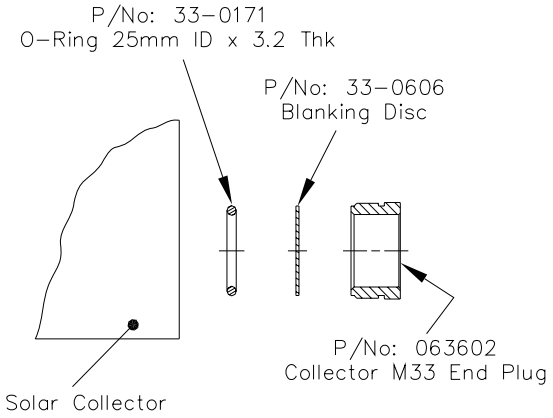
The hot and cold connectors have a thread to allow connection of the hot and cold pipes via a ½" nut and olive.



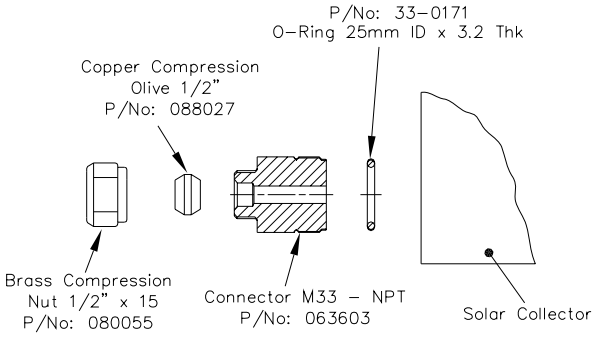
Connector



Connector with sensor well



End Cap



Cold Connector

Booster Timer

A timer is installed in the premises to allow the gas booster to be operated at predetermined times.

In addition, the timer has a 'one shot' operation to override the programmed setting for one programme period. This allows immediate boosting to occur if the hot water supply is depleted or during periods of low solar gain. The 'one shot' operation is activated and deactivated by pressing the 'MAN' button

The timer controls a solenoid mounted in the main burner feed pipe and operates in tandem with the gas valve.

When the solenoid is activated, provided the water temperature is below the gas control setting, the main burner will light. The water temperature is then maintained by the gas control.

Setting the Timer

To set the time of day

1. Press and hold the button marked **"TIME".**
2. Press the button marked **"DAY"** to select the current day of the week.
3. Press the button marked **"HR"** to select the hour.
4. Press the button marked **"MIN"** to select the minutes.
5. Release the **"TIME"** button

To set on/off times

1. Press and release the button marked **"PROG"**, the screen will show **TIMER ON.**
2. Press the **"DAY"** button to select the day/s of operation.
3. Press the **"HR"** and **"MIN"** buttons to select the time on.
4. Press and release the button marked **"PROG"**, the screen will show **TIMER OFF.**
5. Press the **"HR"** and **"MIN"** buttons to select the time off.
6. Press and release the **"TIME"** button to exit programme mode.

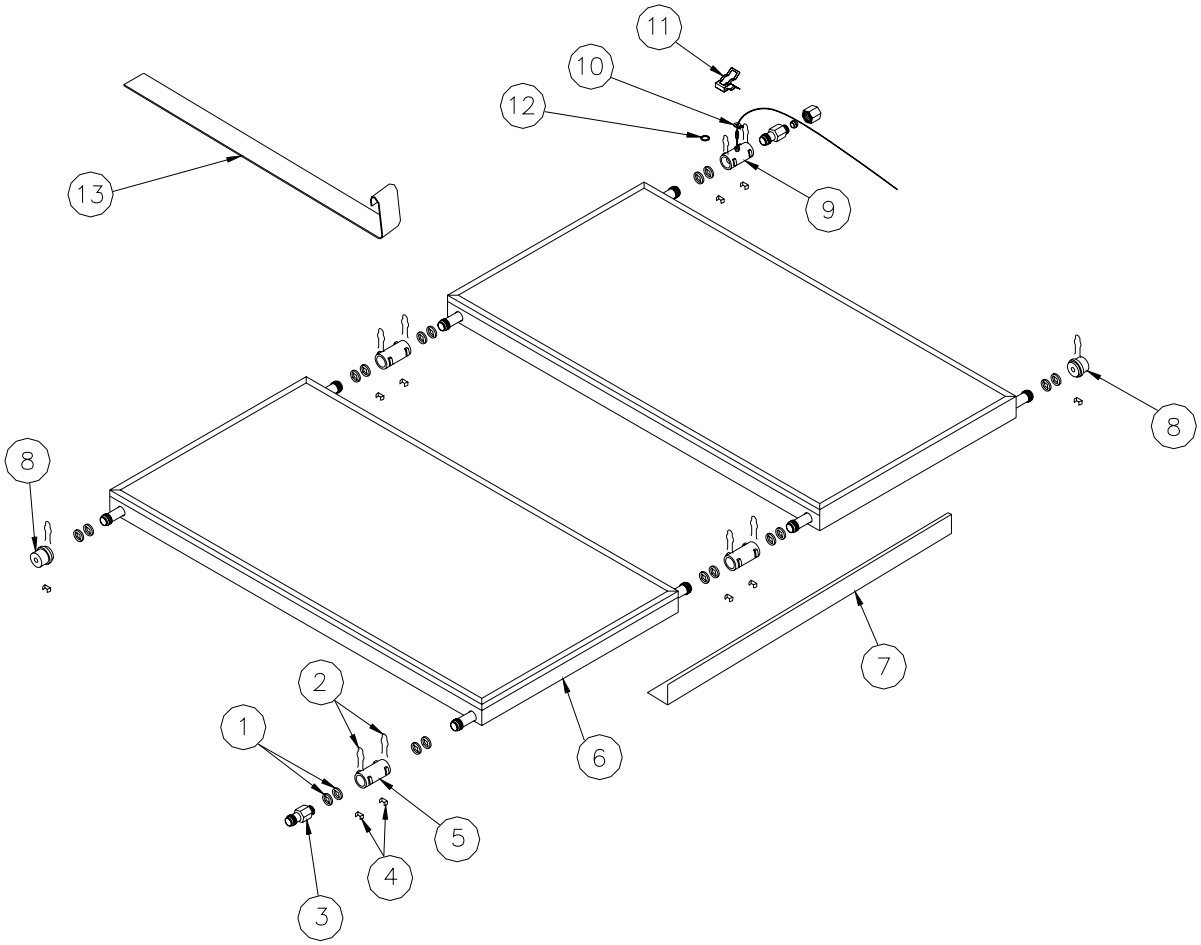
The **"DAY"** button allows selection of the actual day the switching operation is required. Switching programming options are (by repeatedly pressing the **"DAY"** button):

a) Daily: Monday-Tuesday-Wednesday-Thursday-Friday-Saturday-Sunday
b) Monday to Friday (as noted on the top of the screen)
c) Saturday and Sunday (as noted on the top of the display)
d) Monday to Saturday (as noted on the top of the display)
e) Everyday
   Timers manufactured prior to 02 - blank at the top of the display
   Timers manufactured 02 on – as noted on top of the display

Timer Wiring

N – Neutral from power supply and to the water heater.
A/P – Active from power supply
N.O – Active to gas booster
N.C – Not used

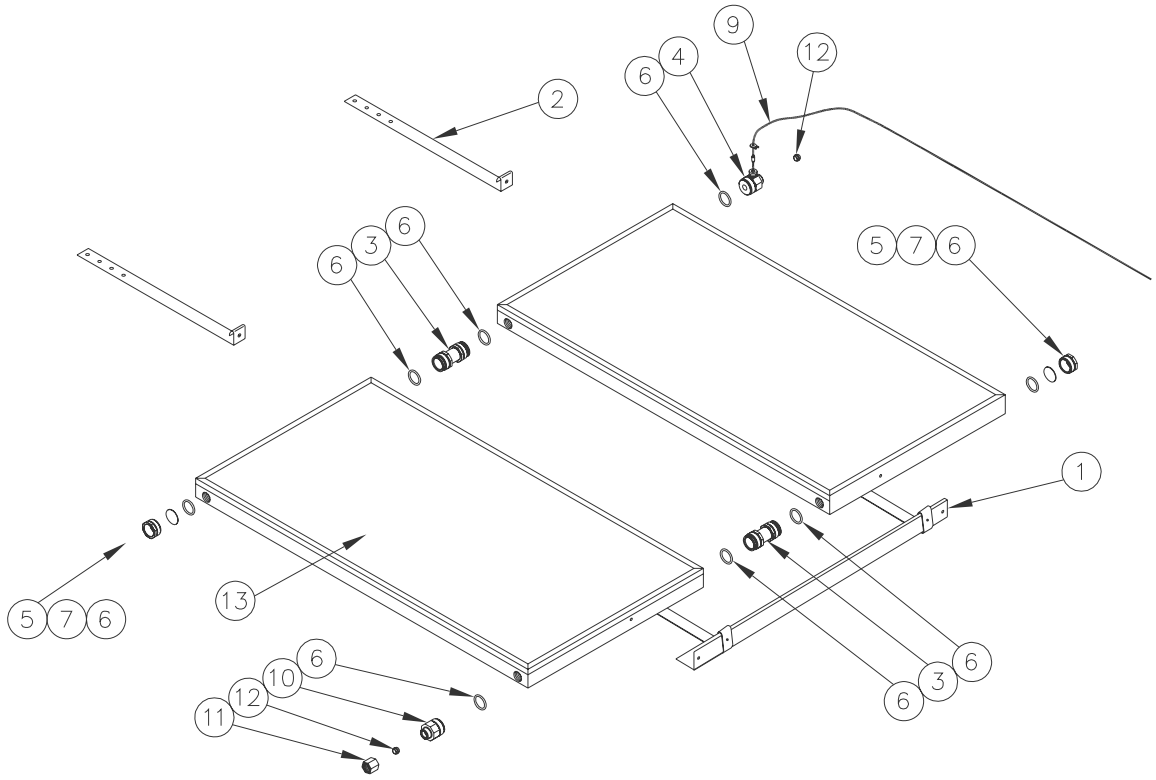
Exploded View – SBT Collectors



Replacement Parts List

Item	Component	Part Number
1	O-ring	087023
2	Spring Clip	088005
3	Quick Connect to ½" BSP Adapter	195704
4	Retaining Clip	088006
5	Connector	195701
6	Collector (Sputtered Copper)	SBT20000
7	Collector Angle (2 collectors)	191613
	Collector Angle (1 collector)	191614
8	End Plug	195703
9	Connector (Hot Sensor)	195702
10	Hot Sensor	056001
11	Sensor Clip	890263
12	Sensor O'ring	087025
13	Collector Strap	191801

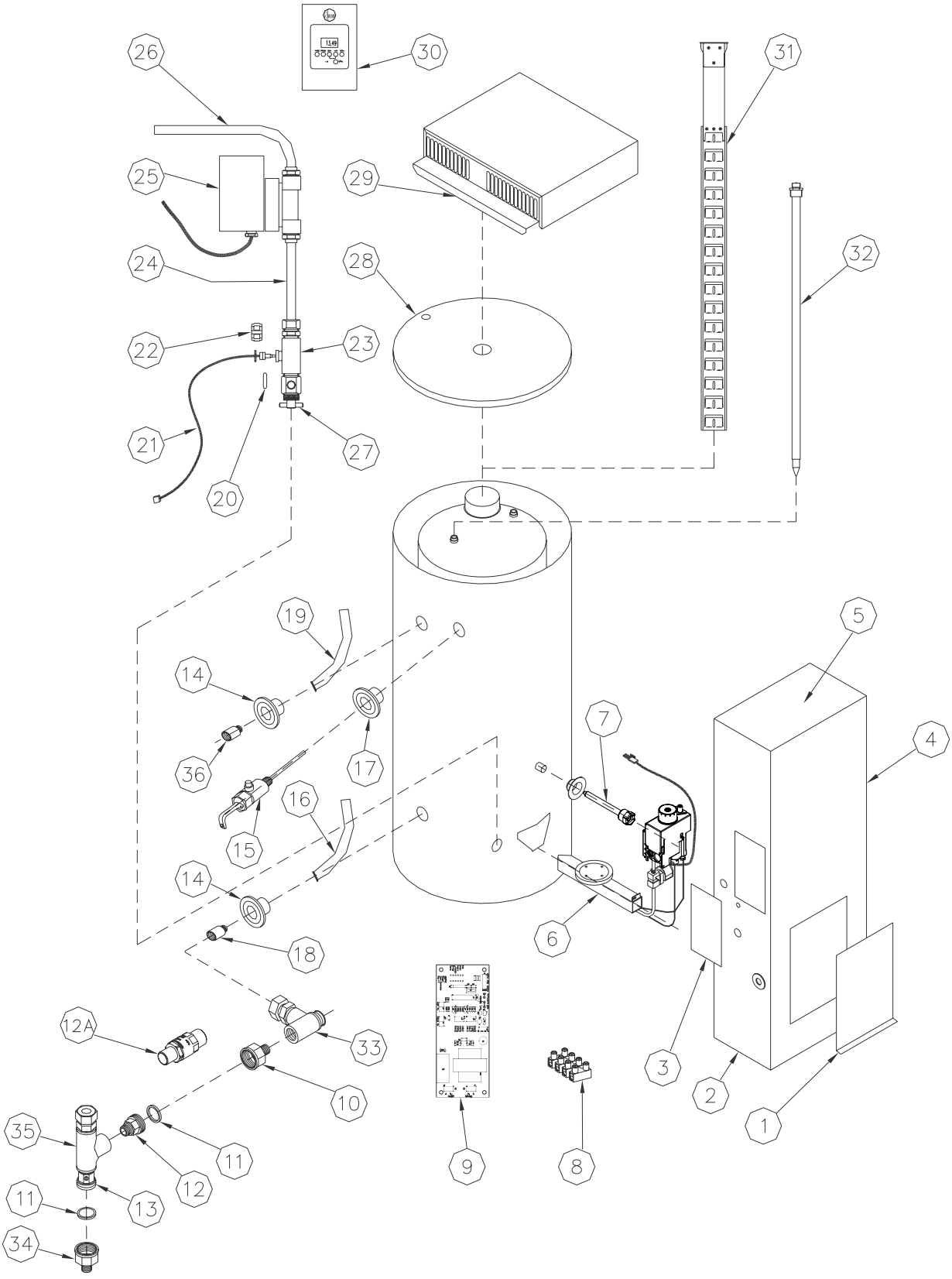
Exploded View – NPT Collectors



Replacement Parts List

Item	Component	Part Number
1	Collector Angle (2 collectors)	191613
	Collector Angle (1 collector)	191614
2	Collector Strap	191801
3	Collector Union	330695
4	Hot Sensor Connector	063604
5	End Plug	063602
6	O-Ring	330171
7	Blanking Disc	330606
9	Hot Sensor	056001
10	Connector	063603
11	Compression Nut	080055
12	Compression Olive	088027
13	Collector (Black Paint)	NPT20000

Exploded View – Water Heater

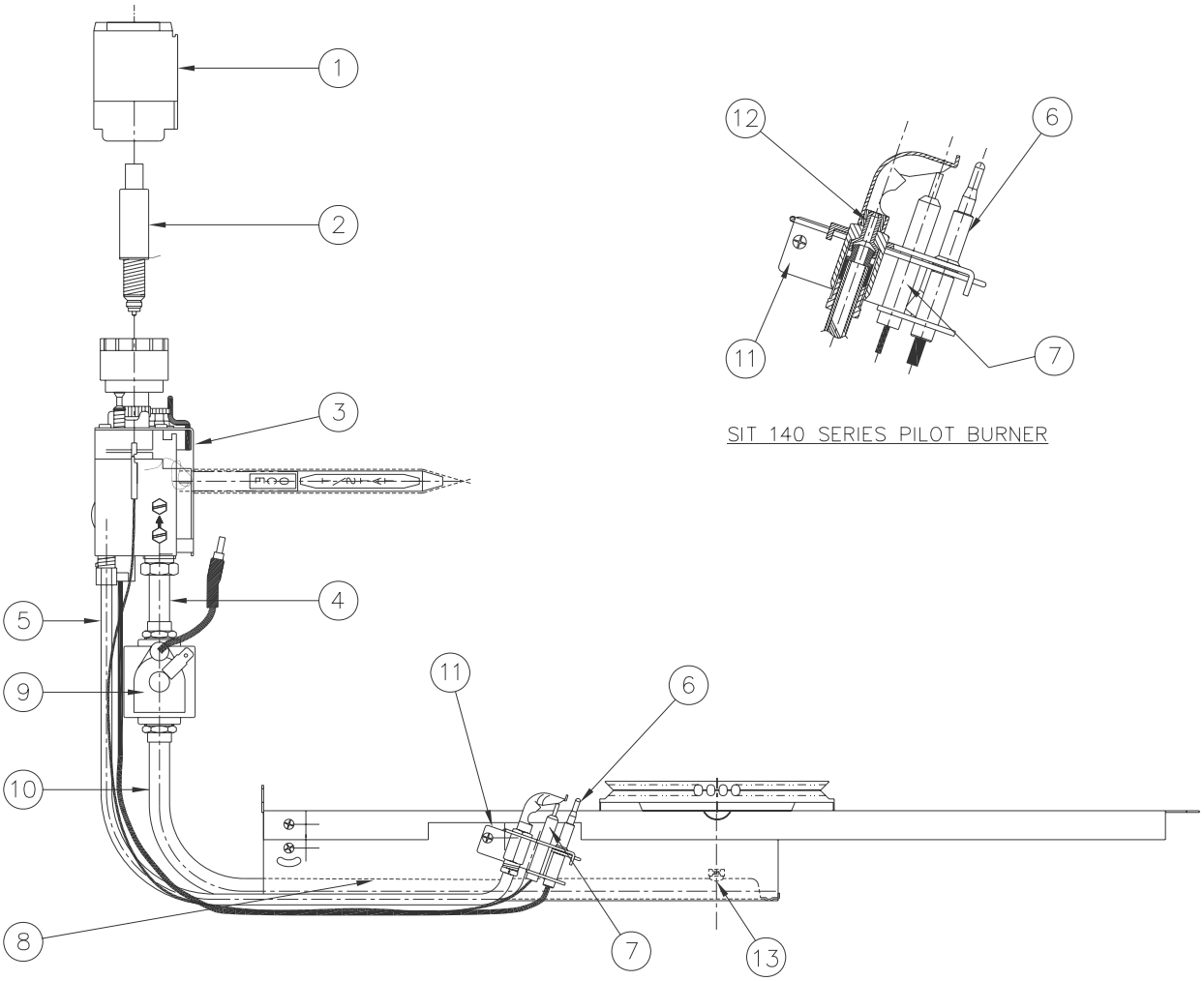


Replacement Parts List

Item	Component		Part Number
1	Access Door - Front		104603-1
2	Air Duct Base		106702-1
3	Access Door - Side		106530
4	Air Duct		106507-1
5	Air Duct Top		106603-1
6	Burner Assembly		Refer to page 52
7	Sheath		079411
8	Terminal Block		051515
9	Differential Controller		052113
NI	PCB support		890264
10	Adaptor 1”F to ¾”M	Use item 12A	NLA
11	Washer		NLA
12	Non-return Valve (Salmson)		NLA
12A	Non-retune Valve (RMC)		088071
13	Bleed Valve		220340
14	Pipe Seal-Inlet/Outlet		221398-1
15	T&PR Valve		220633
16	Dip Tube Inlet		225601
17	Pipe Seal T&PR Valve		221297-1
18	Cylinders with ¾” fittings	Cold Inlet Adapter (¾ x ¾)	060701
	Cylinders with 1¼” fittings	Cold Inlet Adapter (1¼ x ½)	088066
19	Dip Tube – Outlet		225601
20	Sensor O-ring		087025
21	Cold Water Sensor		056002
22	Sensor Clip		890263
23	Sensor Tee		088064
24	Inlet Pipe		080120
25	Circulator		836053
26	Outlet Pipe		080121
27	Drain Cock		224815
28	Jacket Top		101215-1
29	Flue Terminal		104727-1
30	Timer		050505
	Timer Face Plate – Rheem		050503
31	Baffle		071825
32	Anode Black		221909
	Anode Blue		221924
	Anode Green		222036
33	Brass Tee ½” (Used with Salmson Non-return valve)		088058
	Brass Tee ¾’ (Used with RMC Non-return valve)		088073
34	Adapter 1”F x ½”M		088069
35	Brass Tee ½”		088058
36	Cylinders with 1¼” fittings - Hot Outlet Adapter (1¼ x ¾)		088067
NI	Jacket foot		101402
	Name Strip		120813
	Fitting Liner ¾”		221001

NI – Not illustrated

Exploded View - Burner Assembly



Replacement Parts List

Item	Component	Part No	Item		Part No
1	Gas control top cover	890176	9	Solenoid	299656
2	Piezo igniter	890202	10	Lower burner feed pipe - NG	076406
3	Gas cont - NG	079421		Lwr burner feed pipe - LP/But	076429
	Gas cont - LP/ Butane	079424	11	Pilot assy - NG	070922
4	Upper burner feed pipe	076405		Pilot assy - LP / Butane	070923
5	Pilot feed pipe S.I.T.	071515	12	Pilot injector - NG	890181
6	Thermocouple TS	071428		Pilot injector – LP / Butane	890197
7	Spark plug & lead	890175	13	Main injector - NG	073325
8	Burner assembly - NG	070449		Main injector - LP	073355
	Burner assembly - LP	070508		Main injector - Butane	073351
	Burner assy - Butane	070509	NI	Aeration shutter	071201
				Pilot draught shield	076605

NI – Not illustrated

Gas Type Conversions

NOTE: The 531260 series is approved for Natural, Propane and Butane gas types only. Conversions to towns or TLP gas are illegal.

For <u>warehouse</u> gas type conversions the burner operation and gas tightness testing must be completed by dry firing the water heater or fully assembled burner/gas control assembly. Do NOT leave the main burner on for more than 30 seconds if dry firing. Where gas is unavailable for testing gas type conversions must NOT be conducted

1. ***Isolate gas and power supply to the water heater*** and remove the access cover***.***
2. Disconnect gas supply pipe from the gas control.
3. Disconnect the following from the gas control -
   a. Piezo igniter lead.
   b. Thermocouple.
   c. Pilot feed pipe.
   d. Burner connection pipe.
4. Remove the holding screw from the burner-mounting bracket.
5. Disconnect the wiring to the burner feed pipe solenoid.
6. Remove the burner assembly.
7. Remove the gas control top cover.
8. Remove the gas control from the sheath by releasing the spring clip.
9. Change pilot injector to suit gas type. ***Ensure gas tight joints***.
10. Change burner connecting pipe and main burner injector to suit gas type. ***Ensure gas tight joints***.

The burner feed pipe must be changed from a fully rounded type suitable for NG to partially flattened type when converting to LP or Butane. The reverse applies when converting from LP or Butane to NG.

11. Fit primary aeration shutter when converting to Propane or Butane gas, remove the primary aeration shutter or open fully if converting to Natural gas
12. Refit burner assembly ***ensuring joints are gas tight***.
13. Fit replacement gas control, lock into place on the sheath and refit top cover.
14. Reconnect the following to the gas control
    a. Piezo igniter lead.
    b. Thermocouple. Hand tight plus ¼ turn.
    c. Pilot feed pipe.
    d. Burner feed pipe.
15. Reconnect gas supply line. ***Ensure gas tight joint***.
16. Restore the gas supply.
17. Light pilot. ***Ensure lighting instructions, provided on the access door (outdoor models) or the front of the water heater (indoor models), are carefully followed.***
18. Test operation of main burner.
19. ***Test for gas leaks using soapy water solution.***
20. ***Fit manometer and check burner gas pressure.***
21. Check flame quality and if necessary adjust aeration shutter. On LP & Butane Gas the normal position is fully open.
22. ***Change rating label details and fit new gas type labels.***
23. Refit access cover

Gas Conversion Replacement Parts List

Component		Component Part Number		
		NG	LP	Butane
Gas Control		079421	079424	079424
Burner Feed Pipe		076406	076429	076429
Main Burner Injector	Size (mm) Part Number	2.25 073325	1.35 073355	1.30 073351
Pilot Injector	Size (mm) Part Number	0.27 890181	0.18 890197	0.18 890197
Aeration Shutter		Not fitted	071201	071201
Aeration Shutter Opening		Fully Open	Fully Open	Fully Open
Test Point Pressure (kPa)		1.0	2.75	2.70
Gas Type Label		121802	121805	121804
Maximum Gas Supply Pressure (kPa)		3.5	3.5	3.5
Minimum Gas Supply Pressure (kPa)		1.13	2.75	2.75
Hourly Gas Consumption MJ		26	25	25

Warranty - Australia Only

WARRANTY CONDITIONS

1. This warranty is applicable only to water heaters manufactured from 1st September 2005.
2. The water heater must be installed in accordance with the Rheem water heater installation instructions, supplied with the water heater, and in accordance with all relevant statutory and local requirements of the State in which the water heater is installed.
3. Where a failed component or water heater is replaced under warranty, the balance of the original warranty period will remain effective. The replaced part or water heater does not carry a new warranty.
4. Where the water heater is installed outside the boundaries of a metropolitan area as defined by Rheem or further than 25 km from a regional Rheem branch office, or an Accredited Service Agent, the cost of transport, insurance and travelling costs between the nearest Rheem Accredited Service Agent's premises and the installed site shall be the owner's responsibility.
5. Where the water heater is installed in a position that does not allow safe, ready access, the cost of accessing the site safely, including the cost of additional materials handling and / or safety equipment, shall be the owner's responsibility.
6. The warranty only applies to the water heater and original or genuine (company) component replacement parts and therefore does not cover any plumbing or electrical parts supplied by the installer and not an integral part of the water heater, e.g. pressure limiting valve; isolation valves; non-return valves; electrical switches; pumps or fuse.
7. The water heater must be sized to supply the hot water demand in accordance with the guidelines in the Rheem water heater literature.

WARRANTY EXCLUSIONS

REPAIR AND REPLACEMENT WORK WILL BE CARRIED OUT AS SET OUT IN THE RHEEM WATER HEATER WARRANTY, HOWEVER THE FOLLOWING EXCLUSIONS MAY CAUSE THE WATER HEATER WARRANTY TO BECOME VOID AND MAY INCUR A SERVICE CHARGE AND / OR COST OF PARTS.

a) Accidental damage to the water heater or any component, including: Acts of God; failure due to misuse; incorrect installation; attempts to repair the water heater other than by a Rheem Accredited Service Agent or the Rheem Service Department.

b) Where it is found there is nothing wrong with the water heater; where the complaint is related to excessive discharge from the temperature and / or pressure relief valve due to high water pressure; where there is no flow of hot water due to faulty plumbing; where water leaks are related to plumbing and not the water heater or water heater components; where there is a failure of gas, electricity or water supplies; where the supply of gas, electricity or water does not comply with relevant codes or acts.

c) Where the water heater or water heater component has failed directly or indirectly as a result of: excessive water pressure; excessive temperature and / or thermal input; blocked overflow / vent drain; corrosive atmosphere; ice formation in the pipe work to or from the water heater.

d) Where the solar water heater or solar water heater component has failed directly or indirectly as a result of ice formation in the water ways of a solar water heater system: without a freeze protection system; with a freeze protection system where the electricity supply has been switched off or has failed; (Hiline) installed at an altitude more than 600 metres above sea level; (Loline) installed at an altitude more than 800 metres above sea level; where the system has not been installed in accordance with the water heater installation instructions.

e) Where the water heater is located in a position that does not comply with the Rheem water heater installation instructions or relevant statutory requirements, causing the need for major dismantling or removal of cupboards, doors or walls, or use of special equipment to bring the water heater to floor or ground level or to a serviceable position.

f) Repair and / or replacement of the water heater due to scale formation in the waterways or the effects of corrosive water when the water heater has been connected to a scaling or corrosive water supply as outlined in the Owner's Guide and Installation Instructions booklet.

g) Breakage of collector glass for any reason including hail damage. (We suggest that the collector glass be covered by your home insurance policy).

SUBJECT TO ANY STATUTORY PROVISIONS TO THE CONTRARY, THIS WARRANTY EXCLUDES ANY AND ALL CLAIMS FOR DAMAGE TO FURNITURE, CARPETS, WALLS, FOUNDATIONS OR ANY OTHER CONSEQUENTIAL LOSS EITHER DIRECTLY OR INDIRECTLY DUE TO LEAKAGE FROM THE WATER HEATER, OR DUE TO LEAKAGE FROM FITTINGS AND / OR PIPE WORK OF METAL, PLASTIC OR OTHER MATERIALS CAUSED BY WATER TEMPERATURE, WORKMANSHIP OR OTHER MODES OF FAILURE.

Rheem Australia Pty Ltd
A.B.N. 21 098 823 511

FOR SERVICE TELEPHONE
131 031 AUSTRALIA
0800 657 335 NEW ZEALAND
or refer local Yellow Pages

NOTE: Every care has been taken to ensure accuracy in preparation of this publication. No liability can be accepted for any consequences which may arise as a result of its application.

Revision History

Title: - Service Instructions for Solar Loline with Gas Boost		Document Number: - TM006
Rev	**Details of change**	**D.O.I.**
A	Service Instructions issued for 531 series Loline with gas boosting	14/08/2001
B	Company name changed, page references corrected and connection sizes changed	13/11/2003
C	Format updated, Burner Assy updated	10/03/2006